Discovering Sense Making in Information Behavior: An Ethnography of Communication in Work Planning OR "Smelly, like a day old fish"

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* I gratefully acknowledge the support of the University of North Carolina at Chapel Hill for the analysis and writing portions of this project through a Junior Faculty Development Award, University Research Council Grant, and Institute for Research in Social Science award. Graduate assistants Rhonda Grizzle, Neva Robinson, Russ Vanneman, Andrew Stinson and Rong Tang all supported the sense making that made this report possible. Discussions with Barbara Wildemuth and members of her Communication Seminar pointed out the possible relationship of this research to structuration theory (Giddens, 1984).
ABSTRACT

Studies of information behavior typically focus on information seeking and source selection. This study explores the application of a broader perspective of viewing information behavior in relation to the sense making of individual, group, and organization during three annual iterations of work planning. The study is naturalistic in that it attempts to discover patterns of behavior in the light of people performing their own work, in their own manner, and in their own time. Methods are primarily those of an ethnography of communication, where observation of communicative events; interviews; transcripts of meetings, conversations, and documentary traces; and logs were the data sources.

The findings include examples of the recursive interaction of structure–resources like meetings and rules of planning work–and action (structuration). Emphasied in the analysis is identification of factors that contribute to slowdown and breakdown during the work planning process: For example, the time value of information was ignored with the result that additional information gathering was necessary. A conflict between long term survival and shorter-term production goals diverted organizational resources away from both goals toward unproductive discussion and information churning. Differences in individual information styles slowed down the process and frustrated the participants.
ABBREVIATIONS

Deputy Chief  DC
Land Resources Branch  LRB
Land Resources Branch Chief  LRBC
Natural Resources Assistance Unit  NRAU
Department of Natural Resources  DNR
Public Interest Groups  PIGs
Technical Assistance Branch  TAB
Technical Assistance Branch Chief  TABC
Technical Assistance Branch staff  TABs
Water Resources Branch  WRB
Water Resources Branch Chief  WRBC
Work Planning Process  WPP
INTRODUCTION

For me, research is a creative process that builds on a foundation of interests, ideas, anomalies, questions, and intuitions; takes advantage of opportunities; and works around barriers and constraints. Research is also a struggle to balance the necessity for summary and reduction with the need to communicate enough about the researcher’s methods and interpretations to allow readers to judge, while, hopefully, encouraging them to propose their own explanations and to raise their own research questions. The research process, itself, is framed by the decisions that researchers make regarding their questions of concern and the methods that support investigation of those questions. At least implicitly, the interaction of questions and methods is influenced by decisions of focus, situation, duration, and tempo. Thus, one conception of research design and performance might involve the metaphorical selection of cameras, lenses, filters, and film. Do we want a black and white snap shot or a color video? Do we want a close-up or distance shot? Do we want to filter out certain factors or include everything that is framed in our viewfinder? Do we want our subjects to wear costumes and perform tasks that we design or is it all right for them to select their own clothes and to perform their own work?

Brenda Dervin (1977, 1983, 1992) has helped us see the possibilities that varied viewpoints bring to our understanding of sense making in information behavior with her “brick” and “bucket” versus “clay” and “thinking, self-controlling human being” (Dervin, 1983: 169). Taylor’s (1991) “information use environments” framework builds upon Dervin’s ideas. He suggests that such considerations as sets of people, their problems, problem settings, and approaches to problem resolution taken together help us as researchers and information system designers to emphasize solutions that fit the “information use environment” rather than forcing the environment to adapt to our designs.

Bates’ work (e.g., 1986; 1990; Bates, Wilde, & Siegfried, 1993) indicates how our choice of perspectives may suggest varied solutions. For instance, her proposal of variety, complexity, and uncertainty as design principles (Bates, 1986) prompts us to find out what these concepts mean in the information worlds of people and suggests a focus on the range of uses. Neill’s (1992) reflections on the dilemmas of information science hint at the role that the selection of tools by researchers and practitioners plays in capturing one view and obscuring others. For instance, he suggests that the dilemma of method “... in information science is that information creation and use is complex, imprecise, and subjective.” (Neill, 1992: 141). Neill’s analysis suggests the importance of moving beyond just tinkering with the system by grounding that tinkering in situations, people, tasks, and information gaps.

Norman (1993) frames his research and thinking regarding human-computer interaction in the contrast between
system-centered (let people adapt to the system) and human-centered (let the system design adapt to its users) views. As a cognitive scientist, his focus is based upon psychological conceptions of the human mind and emphasizes differences in experiential cognition, which permits expert behavior, and reflective cognition, which promotes innovation, creativity, and new insights. Breakdowns in human-computer interaction are tied to mismatches between task requirements for experiential or reflective cognition and the form of computer support.

All of these views bring Dervin's mantra “situation, gap, use” to mind, where people close the gap between situation and use through “sense making,” which pertains to strategies in use and information values sought. This perspective is most recently exposed in Dervin (1992). Belkin's (1978) “anomalous states of knowledge” similarly focuses on individuals and the information anomalies they face in dealing with situations or topics. Weick (1995) adds a social dimension to sense making by addressing a range of psychological and social properties.

Winograd and Flores (1986) extend the idea of gap a bit by applying the idea of “breakdown” to a language and action perspective for information systems design. Thus, if a researcher focuses on information processing, data elements and decision rules will be likely to receive attention. On the other hand, system stoppages or breakdowns might be overlooked. Giddens' (1984) theory of structuration—or how social systems reproduce themselves—seems to place sense making in the general context of social theory by viewing society—its institutions and its members—as dually producing action and structure through the interactions of agents and their agency, power, structure itself—resources and rules, time, and space. This variety of “perspectivity” seems to be summed up in Dervin and Nilan's “CALL FOR PARADIGM SHIFT” (1986: 12).

What does this mean for research design? Simply, that researchers might consider how differences in perspective, when coupled with choice of research methods, suggest different views of the matters under study. This is not to suggest that we study something that we know so little about as sense making in information behavior from all of the points of view that occur to us. Rather, we need to test where different perspectives might lead us in our understanding of sense making. The perspectives raised by Bates, Dervin, Giddens, Neill, Norman, Taylor, Weick, Winograd and Flores, among others suggest some hints that may lead us towards that higher level of understanding.

The research reported here focused on sense making and the associated information behavior of participants in a work planning task. As the organization under study was a public agency subject to annual appropriations, the task was

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1 Breakdowns: The term “breakdown” is employed here to indicate a situation that occurred during the source of the work planning task that slowed down, temporarily halted, or in some way reduced the productivity of those involved in the task.
performed on an annual cycle that governed the pace and tempo of the effort. By selection, there was no information system per se to serve as a "crutch" or focus for the study. Rather, the emphasis was on the people involved, the situation of their involvement, and how information came into play as the participants moved through the WPP. In short, the interest was in discovering how the individuals separately and in consort made sense of their situation and recursively produced structure and action.

In the next section, some definitions drawn from the current understanding of the nature of sense making in information behavior are considered. The remaining sections of the paper raise research questions, identify methodological and analytical strategies employed during the study, furnish the background necessary to place the findings in context, offer the patterns of sense making that were evident, and suggest implications of the work.

**SENSE MAKING IN INFORMATION BEHAVIOR**

I had originally thought that I would employ the term “human information behavior” to describe the primary emphasis of this research. I did this with some trepidation as human information behavior is guilty of the jargon label as people involved in life and work situations and associated tasks do not seem to describe their actions in that way.

As I proceeded through the analysis and writing associated with this study, I did, however, find subjects using the words: “make sense,” “made sense,” and occasionally even “sense making.” This is not to say that there were not other terms that were commonly employed. There were. For instance, work planning process (WPP) participants frequently made references to their situation as involving “information games.” While this is a good characterization of some of the feelings of the study participants, the “games” label did not capture the gap in communication and shared experience that pervaded those situations that were so labeled. It, therefore, seemed appropriate to me to use the term sense making as a label that often captured both how some subjects described the WPP and how researchers and theorists conceptualize human information behavior.

For the purposes of this study, sense making conveys the idea of a broad view of people’s strategies, expectations, attitudes, and anxieties as they live and work in their information worlds. It also implies the broad range of behaviors beginning with working out just what is stopping progress, creating an information gap, or raising an anomaly. Sense making has a process aspect that includes source selection, information gathering or seeking, assimilation or rejection of the information that has been gathered, information organization or processing, and use of such information (e.g., to support problem solving, create a product, or formulate a strategy or action)—though this process does not necessarily unfold in the listed order. This sense making effort is a nonlinear process that is accompanied by cycling, recycling, false starts, anxiety, as-
essment and reassessment, and sometimes failure or stoppage as time moves on. In addition to allowing time to pass, the conception of sense making developed here allows people to interact and share information—an interaction of structure and action. All of this closely resembles Giddens (1984) description of the process of structuration.

The term information seeking is characteristically referred to by researchers who are in some way concerned with sense making in information behavior. The reader must do some digging to be sure exactly how such terms are being employed. For instance, Kuhlthau (1993a), Dervin (1992), and Chatman (in press) all employ the ubiquitous information seeking term to, in some way, frame their work. Eash, however, presents conceptions of process, learning, and social relations that more clearly reflect the focus and interest of their research than use of the term information seeking does by itself.

For instance, Dervin notes that “The term sense-making has come to be used to refer to a theoretic net, a set of assumptions and propositions, and a set of methods which have been developed to study the making of sense that people do in their everyday experiences” (1992:61). This perspective emphasizes the development of an understanding of how people construct meaning from their experiences. Understanding of what information is comes from the way people define it, seek it, and evaluate and use it.

Kuhlthau’s (1991, 1993a, 1993b) focus led to a detailed specification of an information search process, which emphasizes feelings, thoughts, and actions as people seek meaning from the information that they need to resolve task, problem, or topic. The studies that initiated Kuhlthau’s research stream began with a student’s need to complete a writing assignment—from initiation and topic selection to collection of supporting information and, ultimately, presentation. As an analytical strategy, the emphasis was on the participants’ process of construction of meaning. One of the major contributions of this important work has been the articulation of how emotions, thoughts, and actions tend to change as people move through different phases of the information search process. In part, this understanding flows from the recognition that a person involved in the information search process is confronted by uncertainty, particularly at the initiation of the process, which “… is characterized by vague thoughts, anxious feelings, and exploratory actions” (Kuhlthau, 1993b: 352). This stream of research has been particularly useful in providing a framework for improving information search instruction (Kuhlthau, 1994).

Chatman explores information worlds in her studies of job trainees (1987), janitors (1991) and retired women (1992). In addition to expressing Chatman’s interests in specialized populations and people of lower socioeconomic status, her work is unique in opening the research lens to its greatest aperture and adjusting the focus to allow individual, interpersonal, group, and organizational/institutional views to blend together to provide an extraordinary conception of psycho-
social information behavior. For instance, the stream of information world views provided by the studies of job trainees, janitors, and retired women led Chatman (in press) to identify a set of conceptions—deception, risk-taking, secrecy, and situational relevance—that influenced the information behavior of these people and led to an impoverished information world. Retired women may deceive one another when honesty would lead to a loss of their independence and a ticket to a nursing home. They, also, may avoid risk by not seeking situationally relevant information in order to lessen the possibility that others would become aware of their problems and take some undesired action. Job trainees and janitors might keep knowledge of a job opening to themselves to limit the possible competition.

To the work of Dervin, Kuhlthau, and Chatman, which leads to new visions of sense making and associated information behavior, I think it is important to recognize an example that emphasizes social action through organizational life as sense making. Weick (1993) presents a fascinating retrospective analysis of the Mann Gulch (Montana) disaster of 1949, which resulted in the deaths of 13 forest fire fighters. In his analysis, he sought to understand why an organization unraveled during a time of extreme adversity. He identified two patterns of breakdowns that contributed to the disaster. The first was labeled “shared provinces of meaning” (p. 645), where communication and social construction of the unfolding events failed to occur. The second involved “structural frameworks of constraint” (p. 645), where there was a breakdown in “roles, rules, procedures, configured activities, and authority relations” (p. 645). He notes that these two patterns must work together: “Meanings affect frameworks, which affect meaning” (p. 645). Here is an organizational or institutional vision to complement the individual, interactional, and process views of Dervin, Kuhlthau, and Chatman.

Giddens’ (1984) theory of structuration offers a broad statement of social theory as an encompassing theoretical framework. In particular, he suggests that:

Structure, as recursively organized sets of rules and resources, is out of time and space, save in its instantiations and co-ordination as memory traces, and is marked by an ‘absence of the subject’. The social systems in which structure is recursively implicated, on the contrary, comprise the situated activities of human agents, reproduced across time and space. Analysing the structuration of social systems means studying the modes in which such systems, grounded in the knowledgeable activities of situation actors who draw upon rules and resources in the diversity of action contexts, are produced and reproduced in interaction. (p. 25)

In terms of sense making the key notion here is that people interact with structures—meaning resources and rules—to produce action. In turn, action produces structures. Giddens terms this process structuration and the recursive relationship between structure and action as the “duality of structure”.

These highlights of some of the terminology that pervades the information field were intended to display some of the key perspectives that have guided recent research relating to sense making and associated information behavior. The particular research efforts that were considered emphasize a broadening of view that shows how people move through time
and space as they make sense of their world, interact with other people, and otherwise act to make life and work choices. In turn, the theory of structuration provides a broad umbrella for study and analysis of the relationship of informing actions and structures to other resources and actions.

The relationship of sense making to the other terms employed in the information field returns us to the question of where to set the research lens.

RESEARCH QUESTIONS

Having set the stage with a consideration of how focus limits or expands the research horizon and with an expression of interest in the information worlds of people or the role of information in people's lives, this section briefly introduces the range of research questions that motivated this study. The research questions that served as the impetus for this research are unending:

How do information needs arise and change as people become more aware?

What strategies do people employ as they seek information?

How do people evaluate, select, and factor information into their choices?

How does the situation or context of information use influence people's needs and behavior?

What exactly is "information" to the participants in the study?

Is their concept of what information is stable or does it change over time?

Answers to these and related questions do not involve simple yes or no answers. By beginning to understand the patterns of people's information behaviors, we begin to map the variety, uncertainty, and complexity (Bates, 1986) that are inherent in the information field. We begin to understand how people make sense (Dervin, 1992). We comprehend how people's feelings, thoughts, and actions move forward and fall back (Kuhlthau, 1993). We accept the barriers and constraints that face people in their information worlds as well as the possibilities for building bridges over, tunnels under, and ways around (Chatman, in press). We identify the interactivity of information in task performance and social structure and action (Giddens, 1984; Weick, 1993). Thus, this mapping provides us with the basic materials that aid in building and improving information systems and services. The mapping also provides hope for an eventual theoretical and conceptual foundation for the information field.

Hope aside, it is easy to offer examples of information systems and services where a concern for use would have saved people time, money, and untold frustration. The research reported here tells such a story, of people trying to do their
best, but becoming lost while figuring out how to solve the recurring information puzzle that they faced and making their way through a maze of resources, rules, procedures, constraints, demands, and conflicting viewpoints, as well as too little and too much information.

BACKGROUND

While the people who served as the subjects of this research placed no restrictions on the research and none were promised, I have chosen not to reveal the names of the organization or its personnel other than to say that it is a public agency. The research was originally solicited by the leader of the organization in an honest attempt to speed-up and otherwise improve the resource allocation process that was studied. I used the opportunity to assist in these organizational goals as well as to follow my own research interests in methods for exploring and understanding the information worlds of the organization and its staff.

At the time that this study began, the Natural Resources Assistance Unit (NRAU) had recently been incorporated into the Department of Natural Resources (DNR) of the State of Utopia. Previously NRAU had been a part of a much smaller organization, which had been dissolved. This smaller organization had itself existed for only a few years. As a result of its smallness and newness, it was not governed by a set of established rules and procedures. There was a great deal of flexibility in its operations. For instance, it offered its employees a wide range of flexible scheduling options. Perhaps its most distinguishing feature was that it made extensive use of information technology for the time, having established its own e-mail system.

DNR, on the other hand, was a much more bureaucratic organization with rules for everything including an eight to five no exceptions work schedule. Initially, DNR treated NRAU as an autonomous appendage, showing only negative interest by requesting a cut in appropriations to a minimal level.

While NRAU has many programmatic functions, the one that received attention in this study involved technical assistance to organizations—public and private—who acquire, protect or promote natural resources for recreation and conservation purposes. Technical assistance consisted of planning assistance that aimed to help these public and private interests to work together to balance preservation and use. Thus, the technical assistance was not in the form of grants-in-aid. Rather, it emphasized training and support to those who needed help in realizing some natural resource conservation goal (e.g., planning a bicycle trail, preserving open space, transforming a polluted stream into a recreation resource).

The work planning task, which provided the focus for this study, began with the release of the Executive's budget
in January and ended shortly after enactment of appropriations. That is, there was one iteration per year, which was punctuated with a variety of communicative events and products: meetings, a call for information about projects to be considered for funding, memoranda, notes, telephone calls, and so on. This study continued for three years or three iterations of the process.

The direct participants in the study included the NRAU Chief, Deputy Chief, three Branch Chiefs, and two subordinate staff. Figure 1 summarizes the organizational roles and relationships of these key players in the WPP. The NRAU Chief provided policy guidance for the process. The Chief’s major interest was with ensuring the survival of the technical assistance program and his idea of survival has an interesting twist to it:

My bottom line is survival. By that I mean more than continuing funding. But growing at least a bit. Growth lets us try new things. It brings new ideas into the mix. It lets people move up. Growth begets growth.

His fundamental strategies for achieving survival and growth involved encouraging all participants and interest groups to be heard during the process, and selecting a set of projects that were both high in quality and impact.

The Deputy Chief was the administrative manager for the organization and supported the WPP with financial and process information and database management system training and troubleshooting. The three Branch Chiefs had different operational foci. The Technical Assistance Branch Chief (TABC) oversaw the WPP. The other two Branch Chiefs each represented different sets of external interests—land and water, respectively—and were concerned that projects relating to their responsibilities received attention during the WPP. The staff for the WPP were members of the Technical Assistance Branch (TAB). They collected and maintained project information, drafted memoranda, prepared reports, and generally dealt with the operational and technical details of work planning.

At particular points in the WPP representatives of various external interests also became participants. These included: 1) the administration of DNR, whose interest level and involvement changed substantially over the course of the study; 2) the regional office technical assistance staff, who actually performed the technical assistance work for projects
selected during the WPP, gathered project information, submitted project proposals and follow-up information over the course of the process; 3) the variety of public interest groups (affectionately knows as PIGs), who provided support in creating legislative interest in the appropriation of funds and quality control during project selection; and 4) legislators and their staffs, whose interest was critical—no interest, no funds.

Following up on this preliminary introduction to the setting, task, and participants, the discussion proceeds to consider the methods that allowed exploration of the information worlds and patterns of sense making behavior created by this situation.

METHODS

In the work planning case presented here, I chose to take advantage of an opportunity that arose suddenly and required me to move quickly. Given the absence of the luxury of preparation time, I began the explorations that continued over three years without either a parachute or a security blanket by relying on a broad range of methodological strategies.

I jumped at the chance because the opportunity allowed me to focus my research lens in many different ways in order to explore sense making and associated information behavior in the WPP. I survived the adventure because the research situation that was open to me, and my interests in understanding information behavior called for open-ended exploration and discovery, where the emphasis was on describing, understanding and interpreting the meaning and rationale for participants' actions. Thus, I relied on a set of methodological strategies that had worked well for me in the past: the *ethnography of communication* (Saville-Troike, 1989; Schiffrin, 1994). This approach allowed the flexibility needed to explore the full richness of the forms of communication that helped and hindered progress and provided a methodological framework that enabled quick development of the details of data collection.

An ethnography of communication emphasizes data collection using multiple methods in natural settings and seeks to develop an understanding of the communicative events that constitute the situation. Meetings, conversations, and written messages may all be seen as involving complex communicative transactions that require cognitive processing by the participants and involve the structuration of resources and rules into action and possibly new and revised resources and rules. This focus on communicative events provided an initial approach for organizing and orienting data collection, while bringing together the evidence needed to reconstruct the participants' patterns of sense making during data analysis. A major emphasis of the research design and the choice of methods was to capture as much of the dynamics of these communicative events as possible. Another concern was with charting the evolution of the WPP to capture the learning aspects of the proc-
Data Collection

The particular methods that were employed in the study were chosen to complement one another by providing related views of the communicative events under study. These methods included observation, participant work planning logs, interviews, and the documentary traces of the WPP. Observation was of a persistent and extended nature. Formally, the observations concentrated on the various meetings, in whole or part, where three or more participants worked together to move the WPP along. Key to these observations of meetings was the tape recording of the complete session. Having a tape-recorded record allowed me as the observer to focus on actions including body language and details such as references to charts, which were not apparent on the audio tape as well as to record background notes, questions, impressions, and seeming impasses, gaps, or blockages in progress. Since I had the audio record of the meeting to fall back on, I was able to observe in an informal manner rather than be tied to a formal observation guide. As a participant in these meetings, I was free to ask questions and contribute as I wished. Similarly, I could follow-up afterwards by asking for clarifications from the other participants. I confined such interaction to my role as facilitator and keeper of the WPP memory.

Less formally, observations were made during the conversations that occurred when another participant came to me with some question or request for clarification with regard to the WPP. When scheduled these events were audio recorded. Whether scheduled or not, notes were made during and after the conversation to record the character and function of the event, any requirements for follow-up, and any information behaviors or breakdowns in progress that were evident. Informally, unplanned random overhearings of reports of work planning behavior were also noted.

Participants were asked to maintain logs of their actions pertaining to the work planning task. These logs provided a record of meetings, conversations, telephone calls, written documentation that the participants either initiated or received. The logs were collected on a form that prompted for date, beginning and ending time, participants, and brief gist of the event or activity.

Documentary traces of the WPP were also conscientiously collected. These included drafts of memoranda, final memoranda, guidelines, tables, computer generated charts, the big white sheets from flip charts, Faxes, etc. The documents added an extremely important dimension to the analysis: They grounded the work planning in a series of interim and final products that not only established a time-line, but, when taken together with observations of meetings and other conversational events, provided evidence of the pieces of information, information behaviors, sense making approaches, structuring actions, and differences in viewpoint that facilitated and impeded progress.
Informal interviews tied the observations, participant logs, and documentary traces together by providing a mechanism for resolving inconsistencies, filling gaps in the record, and digging deeper into the rationales and concerns of participants. These were short events, seldom exceeding fifteen minutes, that simply tried to get the participants to explain their points of view. I initiated them with openings such as: "I wasn't clear when you said," "How did you reach that conclusion," "Where/how did you get that piece of information." These openings were followed-up as necessary with neutral sorts of questions (Dervin & Dewdney, 1986) that addressed situations (e.g., What circumstances led you to that conclusion?), gaps (e.g., What is missing?), and uses (e.g., How would that be of help to you?) (Dervin, 1992) within the information worlds of the participants. If participants were troubled or confused by some report or other display of information, they were asked to think-aloud as they tried to interpret or use the exhibit.

In sum, success in capturing the data of this study came from the following mechanisms. Formally scheduled meetings were recorded and transcribed by agreement of the participants. The primary players in the process agreed to keep logs of information or communication actions connected to the WPP. These were collected usually on a weekly basis through a short meeting where I was able to ask questions about entries while the information was still fresh in the minds of the participants. As a participant in the process, I was involved in most formal and many informal aspects of annual work planning. My role was as observer, information repository, and memory. I served as advisor and facilitator, which legitimized my presence, but minimized my influence on events within the WPP.

Analysis
As is typical in an ethnography, data collection and analysis were interwoven: Field notes and transcripts from observations were used to inform interviews and suggest initial interpretations. This sort of interaction between data collection and analysis during the course of the study is something that I think of as "petite" analysis. The data collected during each communicative event was viewed and reviewed, and, then, expanded by annotating the data with analytical notes, questions for participants, and questions for further consideration. Thus, each data collection session informed those that came after. I refer to analysis that took place after extended and repeated data collection was completed as "grand" analysis. This analysis involved the broad, inclusive examination of the data including the progression of "petite" analyses that was needed for my own sense making of the patterns of information behavior that were exposed over the course of the research.

Both forms of analysis (petite and grand) were facilitated through the use of a text management software package named askSam (askSam Systems, 1994). Observer notes; transcripts of meetings, interviews, and think-aloud sessions; and participant logs were entered into askSam. Most documents already existed as word processing documents. These were eas-
ily imported into askSam. Expansions of notes, transcripts, logs, think-alouds were added to reflect my interpretations, comments, questions, and plans for future data collection.

A key aspect of the analysis process was the development of a classification scheme for coding of this data. This classification scheme was developed "on the run" over the course of the study as part of the "petite" analyses. An initial guide was provided by Dervin’s (1992) sense making framework of situations, gaps, and uses. The classification scheme for those situations, gaps, and uses reflected those apparent to the study participants in the data. Other aspects that were needed to construct the information worlds of the participants were identified as data collection proceeded and the analysis unfolded. These included participant (P-?), where ? is a variable), communicative event (CE-M, for meeting), task process stage (T-A, for allocation stage), products (P-PS, for policy statement), information behaviors (IB-?), information needed (IN-?), sought (IS-?), and used (IU-?) for work planning, and sense making properties (SM/P-?) or strategies SM/S-?]. Ultimately, these codes provided a basic mechanism for tracing patterns and identifying themes in the data. For instance, if I wished to look at the pattern of gaps or breakdowns that confronted P-J (participant J), askSam allowed me to browse chronologically through the data to review the relevant notes and annotations. With the assignment of codes along with free-text search capabilities, I could quickly revise codes or add new ones to the text base. If I were mad enough to undertake a study of this sort without the benefit of computer support, I would quickly be buried under thousands of pieces of paper. With computer support, I have managed with a minimum of paper.

The "grand" analysis culminated with the submission of the final draft of the research report for peer review and member checks. Peer reviews and member checks are two mechanisms for enhancing the research’s match with reality (Merriam, 1988). The peer reviewers were researchers with an interest in the area of sense making and information behavior, who examined and critiqued the whole report. The peer reviewers offered suggestions that improved the clarity of the discussion and provided additional details of explanation. For instance, the suggestion was offered and taken that quotations from transcripts be made more readable by eliminating the transcription conventions that are typical of detailed conversational analysis, particularly the *ums* and *uhhs*. Each of the primary participants in the study was given the opportunity to review the research report. Several of them chose to do so and each confirmed the accuracy of the report and, in a couple cases, provided useful interpretive comments. Taken together the data collection and analysis approaches that comprise the methodology of this study were designed to achieve a rigor that is bought about by making the data and its interpretation freely available (Guba, 1981). Thus, readers are encouraged to develop and offer their own interpretations as well as to replicate and extend the research to other information worlds (Constas, 1992).
Given the wealth of data resulting from the data collection and analysis approaches outlined above, the next challenge involved a balancing of the data reduction and summary interpretation required to identify and understand patterns of sense making present in work planning with the inevitable need to preserve the dynamic aspects of people's efforts to understand, plan, process, evaluate, use, and even ignore information. The approach taken here considered the data from several perspectives beginning with the broad trace of the WPP, moving down through organizational, group, interpersonal, and individual sense making.

**THE WPP: PHASES OF THE MOON**

The interest here is in providing a broad view of the total WPP through its three iterations. Questions that underlay the analysis include: What is the WPP? How and why does the process change from iteration to iteration (year to year)? How do these annual changes signal breakdowns? What clues does the analysis provide to understanding the broad sense making and associated information behaviors inherent in the WPP?

When we zoom out to view the WPP in its entirety, there is a trace of three years of effort that represents movement through time and space. Recognizing that the details are hidden in this comprehensive view, this broad view shows clusters of activity that suggest the major subtasks of the WPP as well as the advance of time. These clusters, while evident in a mapping of the WPP, were not apparent in the participants' views. Rather, the participants' focus was on the product of the total annual process. Consequently, their planning for information gathering in support of the WPP focused on the allocation of funds to specific projects. The subtasks were neither seen nor valued separately. The subtasks, thus, suffered from discontinuities in time and space that might have been avoided with some consideration of the time relationship of possible phases of the process.

While there is a similar general pattern of differentiation of subtasks in each of the three iterations of the WPP that were studies, there were also substantial differences in the distribution of activities across time and space, the amount of time spent toward achieving particular ends, associated information behaviors, and the character of information that was collected to support the process across the three iterations. These differences reflect an interaction between learning and evolution of constraints and other situational factors. Thus, this broad view provides some important clues to the dissatisfaction and frustration that the participants faced throughout the three iterations of the WPP. Highlights of the three iterations are presented in the following.

**Year 1**

The WPP during year 1 operated freely without constraints or guidance imposed by the umbrella DNR organization. This
absence of interest reflected DNR's position regarding future funding for NRAU. While DNR's mission was internally oriented towards the management of the natural resources held in trust for the citizens of Utopia, NRAU was externally oriented towards providing technical assistance beyond the boundaries of DNR to public agencies and private organizations. While these two different missions could well complement each other and provide opportunities for internal and external coordination, the daily pressures of road maintenance, trash collection, and the like, along with inadequate funding for internal operations and maintenance led DNR administrators to an internal perspective. NRAU was, thus, a "thorn" in DNR's side and DNR aimed to get rid of this thorn by requesting no funding in its budget request to the legislature for technical assistance activities. DNR's strategy was to seek the funds so released for its operations and maintenance priorities. Thus, while NRAU periodically reported on its activities, including requests for information from external interest groups and the legislature, there was no evidence that these reports or copies of correspondence received anything but cursory attention from DNR.

Spurred on by the encouragement of various public interest groups (PIGS) with a natural resources conservation and use focus, some of the study participants worked to influence the appropriation process in the legislature. These marketing efforts were based on close cooperation with the PIGs who, through a coordinating coalition, served as an information and influence conduit between NRAU and key legislative committees and staffs. The two key questions that came out of these legislative contacts were:

*What projects benefit my district?*

*Was there sufficient demand for these technical assistance services to justify added funds?*

It became clear to the participants that a list of potential projects was needed to support the marketing effort with the legislature.

Looking at the work planning task as an undifferentiated whole that emphasized the final product of a list of funded projects, the NRAU staff developed a project request form with some 20 information items (e.g., project name, region, political jurisdictions, initiator, sponsor, objectives). This information gathering requirement was imposed with short notice on technical assistance staff in regional offices spread around Utopia. Mapping the communicative events of the first year, however, show three clusters of activity: an initial flurry of activity that I think of as marketing, a second set of events that aimed to develop criteria for choosing among and ranking projects, and a final cluster that applied these criteria in ranking the projects.

Only a few of these 20 information elements were required for marketing purposes (e.g., project title, location, a
funds estimate, and a short description of the project). Thus, a slowdown resulted from this large information gathering and processing effort, which led to a great deal of information that clogged the information transfer channels and occupied staff unnecessarily: "OK, now that we have it, what do we do with it?" At this stage, while all of this "stuff" was entered into a database, summary lists and other reports were prepared with the data sorted in various ways, and these products were widely distributed, the required pieces of information were simply the total of all of the project estimates (i.e., some $4,000,000) and a geographical project listing by legislative district. Thus, most of the information collected, processed, and distributed went unused.

This surfeit of information led to the next phase of specifying project criteria:

How do we use this stuff now that we have it? I think that we need to decide what our criteria will be. Now that I think about it, we should have set the criteria first. Now we'll probably have to go back and ask for more stuff.

The criteria resulting from this effort are listed in Table 1 and include baseline requirements that all projects needed to possess before consideration as well as selection factors. This phase had two primary elements: brainstorming, where possible project criteria were suggested and discussion, where agreement was eventually reached on the criteria to be employed in project selection and ranking. There was no thought given to standards and measures at this time. So, while one criteria involved potential for extensive use, no one considered what extensive use might be. Thus, the NRAU staff did have to request additional information for some of the criteria (e.g., projected number of users of the resource).

By the time the actual project ranking process began, it had been some seven months since the project information had been collected. While the collection of detailed project information at the beginning of the process was accepted without comment by all participants, it became clear that this approach neglected the time-value of information in the process: the quality of the information substantially deteriorated. Time marches on and neither natural resources or people stand still.

Much of the work during the third phase of the WPP for Year 1, as evidenced by the kind and character of communicative events, involved checking and rechecking the status of projects as well as adding possible new projects. Also raising flags and requiring follow-up was the fact that many of the 20 information elements that were collected involved information that was subjective. One of the participants in the study called it "slimy," saying: Sure, everyone of them [regional office staff] is gonna say their project is the greatest thing since sliced bread. But how do I know that is so? Well, I talk to them and I talk to the local folks, the cooperators, the grassroots people.

In sum, the Year 1 analysis shows a pattern of framing of products, preparation, information gathering, processing, and use. Framing did not include a thoughtful analysis of requirements. Rather, the product and process were quickly determined. It was not until information gathered and processed came into use that deficiencies were noticed. These deficien-
cies, in turn, set off another cycle. During Year 1 this recycling was repeated three time before time ran out. The third recycle provided the basis for renewal of the work planning cycle in Year 2.

Year 2

By Year 2 the administrators of DNR had realized that NRAU was not likely to disappear as the technical assistance program received an increase in appropriations. Also, the cooperation between NRAU as a unit of DNR and other public and private interests helped heal some of the wounds left by the “land stealing” policies of DNR. DNR still did not ask for any funds for NRAU’s technical assistance program in its budget request, but it began to “bestow favor” on NRAU’s efforts by bringing the process under its administrative control. This was reflected in two formal “innovations.” The first involved the creation of a new position, Assistant Administrator for External Programs. The Assistant Administrator monitored NRAU’s activities and approved any policies by signing off on them before they were sent to the regional offices. The second “innovation” involved a ranking process by the seven regional office administrators. The idea here was that the regional administrators were in a better position to decide which projects were best for their regions, despite the systematic process that NRAU had developed. While NRAU still provided a ranking of projects as input to the regional directors efforts and, in fact, excluded some projects that did not meet the minimum requirements for project inclusion, the regional directors, through a round robin process, were free to come up with different priorities, which they did. All involved had project lists developed by the NRAU staff with a few of the elements contained in the project database (i.e., name funding estimate, short project description). In addition, each regional administrator had more elaborate information about projects located within the region that was employed to show the other administrators the important contribution a project was expected to make.

The surprising thing that came out of this process for NRAU staff was that some of the regional administrators yielded their “draft pick” to another region. Thus, the differences between NRAU’s project rankings and those adopted by the regional administrators resulted from elimination of significant (in terms of NRAU’s rankings) projects in one region in favor of less significant projects in another region.

There was also a less formal “innovation.” One regional office wanted to pursue several projects that did not meet the minimum criteria. Somehow these projects appeared as earmarked projects in the appropriations bill, which reduced the funds available for higher priority ranked projects.

Given these innovations and the Year 1 experience, the WPP had some differences. The first difference involved the transformation of the marketing process from a demand focus to one of accomplishments and action. Having shown that
there was a substantial demand for technical assistance, the wish list was not updated. Instead, the NRAU staff decided to develop an annual report, which highlighted successes, and also contained summaries of the projects that were underway, organized by geographic area. The primary aim of this report was to show that the funds were being well-spent. This annual report was tied to a related effort to periodically examine project performance through the development of a project status form. This form provided the input for both the annual report and project assessment. The annual report included: project name, location, descriptions of status, conservation impacts to date, and expected future impacts. Conversation successes were highlighted. Information gathered for project assessment purposes included work months consumed to date, expected completion date, staff assigned to the project, cooperative agreements, and products-completed and in progress.

This seemingly rationalistic approach to information gathering, which was designed to support other rationalistic endeavors (project assessment), once again, led to the collection of information that was out-of-date when it was time to use it and much information that was never used. Even in the case of the information specifically collected for the annual report, very few of the project descriptions contained sufficiently descriptive information. Thus, the data collection via the project status form needed to be supplemented by numerous phone calls to regional office project staff. In retrospect, perhaps the most useful data element, the phone number of project staff, was not included on the project status form. Thus, in Year 2 the marketing and evaluation functions were differentiated from project selection and ranking.

The selection and ranking phase of the Year 2 work planning began by providing copies of the information contained in the database for each project and a request that blank forms be completed for new projects to the regions. Only a handful of projects were completed or expected to be completed by the end of the fiscal year. Thus, most of the project sheets were returned with corrections and updates as requests for continuing project funding. In addition, an excess of new project submissions were received. This combination of continuing and new projects made the selection and ranking process much more difficult as there were five times as many projects up for funding as probable resources would allow.

Since there was a commitment to systematic review of all projects, elimination of those candidate projects that did not meet basic criteria (e.g., cooperation, cost sharing, and public involvement), and ranking projects by regional office for the regional directors meeting, a decision was made to constitute a task force consisting of the NRAU staff whose major responsibilities were work planning, along with representatives drawn from the PIGs' technical assistance coalition, and the regional office staff.

The aftereffect of the regional administrators project selection decisions was further frustration and discouragement for the NRAU staff who had spent considerable time developing project rankings that were at least partially ignored. Also,
final rankings needed to wait until the legislature had appropriated funds for the next fiscal year and provided associated guidance for their expenditure. As it turned out, while there was a funding increase, there were actually less funds available for ranked projects, as some funds were earmarked or set aside for the pet projects of some legislators. Thus, a number of projects that NRAU staff considered to be of critical significance could not be funded.

Experience and changing environmental conditions refocused the WPP on marketing, project evaluation, and project selection. Yet, the same pattern of quickly framing products, followed by laborious information gathering and processing, and, then, attempted use, which identified inconsistencies, inaccuracies, and missing data elements, reoccurred. The repeated jump to an answer without analysis of the question led to costly attempts to make sense when the answer and the question did not satisfactorily match. As one consequence, Feldman and March’s (1981) insight “that organizations systematically gather more information than they use, yet continue to ask for more” (p. 171) was certainly in evidence during the WPP.

Year 3
During year 3 the refrain of “no formal request for funding” for NRAU’s technical assistance activities was played once again by DNR. However, support within the legislature seemed to have solidified so that funding at the Year 2 level was virtually assured. Due to pressures to reduce spending and the associated adoption of a spending cap by the legislature, there was little hope of any funding increase even with many good projects waiting in the wings.

Since the annual report had worked well to get and maintain the interest of legislators and cooperators, it was continued. The initial part of the WPP relating to marketing and evaluation continued without change. Project evaluation information was collected again, but for the most part went unused. Many phone calls were made to fill in the gaps for the descriptive information required for the annual report. Thus, after three iterations of the WPP, information gathering and processing took on a ritualistic character. By ritualistic I mean that formal information collection had become proforma with the emphasis of effort being on completion of the database, rather than accuracy or relevance. It was more important to give the impression of a rational and systematic process than it was to make certain the right pieces of information were available to answer important questions.

This replay of the Year 2 marketing and evaluation subprocesses was once again motivated by the answer that that project and program evaluation should be done without consideration of what evaluation questions needed to be answered. As one of the work planning participants commented:

Even though we haven’t had the staff time to pursue project evaluation, we have been able to develop a substantial project database. We can use it to compare the planned with the actual.
There is something of a contradiction here. The staff in the regional office take time away from their technical assistance project activities to fill out project status forms and the NRAU staff take time away from their project and program evaluation aims to construct, maintain, and produce unread reports from the project database. At the same time, projects fall behind schedule and the goal of evaluation to make things better is thwarted. Also, a variety of contextual information regarding both candidate and ongoing projects is not sought. The well-intentioned drive of a rationalistic emphasis on accountability and improvement somehow made things worse.

While there was no evidence of any effort to think this “gap” through or that the participants noticed this contradiction, the extreme of frustration felt by some of the participants came to the surface frequently. The process was characterized as cumbersome, unwieldy, oppressive, and the like. One participant spoke for many:

I thought it was gonna be such a simple thing when we first started this [the WPP] a couple of years ago. It wasn’t long though that it became a nightmare with mucho time spent passing paper around. Oh, and those interminable meetings. It’s like swimming through Jello. . . . Ugh! We have to find a better way. We’re spending lots of time spinning our wheels. We need to help the regions, not add more roadblocks.

Thus, without knowing exactly what had led to this feeling of “swimming through Jello,” there was a general consensus for simplifying the WPP. There was no consensus as to what form this simplification would take, however.

Ultimately, the backlog of projects, the slow down in project completion, and likelihood of stable or declining funding over the next couple of years forced a halt to unthinking repetition in the WPP and led to an interest in productivity improvement. Finally, questions were being asked before the answers were decided upon: “What can we as a support office do to help the project staff in the regions improve their productivity?”

This productivity enhancement goal led during Year 3 to a number of new “rules of the game” that were designed to enhance productivity as well as transform what had begun to be seen by some as an adversarial relationship between NRAU and the regional office staffs. Three of these, which all are based on the development of interorganizational linkages and shared experiences, merit attention here. First, was the strategy of appointing NRAU staff members to serve as advocates for the regional offices. Thus, the advocate for a particular regional office would become the primary channel for information transfer between NRAU and that region. The advocate would be conversant with the region’s plans and projects, well-versed in the region’s strengths and weaknesses, a champion for the region within NRAU, and a confidante in aiding the region to strengthen its capabilities.

The second strategy involved periodic program building sessions with regional office staff. This took two forms. One involved expansion of the annual program meeting by adding staff development sessions to solve common problems
and training opportunities in such technologies as geographic information systems. Another initiated a regional office support team strategy, where a small but select team of experts would be sent as required to help the region with its specific problems.

The third strategy involved a substantial simplification of the project ranking and selection phase of the WPP as well as decentralization of the process to the regional offices. In order to accomplish this decentralization, the regional offices were provided with a "base funding estimate," which gave them a funding target for their planning purposes, and program planning guidelines, which encouraged the development of a mix of projects that met the technical assistance program's project selection criteria (cf. Table 1). In turn, the regions developed and shared their annual work plans. The regional office work plans were used by NRAU to identify weaknesses in the project mix or areas were there were staffing gaps and training needs. This approach really did reduce the completion of forms, the passing of paper, and the gathering and processing of unnecessary information. It focused attention and effort on likely resources and did not force the regions to spend time planning for new projects that could not be funded. It vastly cut the numbers of meetings and other communicative events that had in Years 1 and 2 been associated with the project ranking and selection phase of work planning.

Several of the lessons learned through the three years of the WPP may be applicable in other situations:

That work takes time is a common oversight.

Information has a time value.

The euphoria of creating something new may become lost in the drudgery and repetitiveness of information maintenance and update.

Thus, the creativity and analytical attention present during design and implementation may be replaced by mindless paper pushing, data entry and the like. Eventually, such boredom and related frustration may serve as an impetus for change. As a consequence, time and timing in designing work processes and associated information gathering, databases, and reports is critical for tying information gathering and processing to productivity.

Properties of organizational sense making are related to the WPP in the next section.

ORGANIZATIONAL SENSE MAKING

The analysis of this section is motivated by Weick's (1995) treatise Sensemaking in Organizations. In this work he conceptualizes sense making in terms of seven properties: identity, retrospect, enactment, social, ongoing, extracted cues, and plausibility. The following introduces these properties and their instantiation in the WPP.

Identity. This property not only refers to the collective belief about why the organization exists, but includes the
machinations that the participants in the organization go through to create identity. Identity, accordingly, might evolve over time. Thus, one focus for sense making involves the creation or understanding of an organizational identity: Why does the organization exist? How will it perpetuate its existence? To what extent do the members of the organization have a common sense of organizational identity? How has the organization's identity evolved?

Several years before the beginning of this WPP study, NRAU was created to perform the ill-defined mission of providing technical assistance in the natural resources area. This was initially translated into a four-pronged effort to provide information services, training, self-help publications, and demonstrations of model conservation strategies. Each of these technical assistance strategies received good reviews from those who benefited. Yet, when a new administration, bent on decreasing spending, came into power, it became clear that the demonstration efforts, which were specifically tied to physical land and water resources, which were associated with political constituencies, was one strategy that would generate support for funding in the legislature.

Thus, there is a tradition of sense making within NRAU, that has allowed it to survive and even flourish in the face of strongly negative forces by adapting the organization's identity in the face of environmental change. For example, many of NRAU's staff sought to build interorganizational linkages that allowed NRAU to adapt and thrive in its turbulent environment.

Beyond this external orientation, there was also another thread of sense making and identity within NRAU. It emphasized production or what came to be known as "conservation successes," where the theory was that, beyond co-optation of members of the legislature by proposing projects in their districts and cooperation with PIGs, ultimately a record of performance was necessary.

Retrospect. People make sense of their current situation by looking backward and revisiting past actions and their success. This retrospective look limits what aspects of the past are recalled as it is anchored in the current situation. Thus, memory of the past is limited both by what has been recorded and by the current situation. Such individual tendencies or biases in decision making as adjustment and anchoring, availability, and representativeness (Tversky & Kahneman, 1981) seem to influence the retrospective property of sense making. Retrospect, also, seems to promote synthesis of meaning in an attempt to reduce equivocality about preferences, priorities, or values, for example. Those tried and true strategies that an organization and its members employ provide excellent instances of retrospect.

NRAU's primary strategies of cooperation and production have their roots in the past. The major adaptation in these strategies over time involved movement from employing them both internally and externally to discovering that their
external application produced the greatest benefit. This shift in strategy became necessary when NRAU was incorporated into DNR, which saw NRAU as a drain on the resources available for supporting its activities.

**Enactment.** Enactment refers to the property that in sense making people produce their own environment. When people follow through on their sense of the situation and act on their interpretations, their actions influence what happens in the future. Thus, enactment is a dynamic property that tends to lead to evolution in sense making.

Enactment is evident in many aspects of the WPP. For instance, discussions with legislative staffs by NRAU members or cooperators raised awareness of the positive impacts of NRAU’s programs. These discussions also modified the legislature’s expectations regarding NRAU’s future activities. Enactment, also, was evident in the criteria employed during project selection and in the evolution of projects selected. Later projects tended to be much more complex than early projects, involving, for instance, multiple resources, technology, and ambitious aims. That is, the learning, interpretation, and sense making that occurred during early projects influenced the acceptability of later projects.

Similarly, DNR’s involvement in the WPP during Year 2 resulted from the funding success of Year 1. Finally, the ingrained bias of those with a commitment to natural resource conservation to associate with others with a similar commitment and to avoid those with a commercial interest was overcome when a commercial river runner organization became involved with one project. It became apparent that this organization was not an obstacle at all, but rather served as an important ally in conveying that conservation can have important economic benefits in terms of jobs and economic growth and development.

**Social.** Socialization, reference groups, norms, roles, formats, standards, communicative events, patterns of communication, and the like influence perceptions and interpretations. Thus, an important property of sense making relates to the slant—positive or negative—that is encouraged by the social system.

Evidence of the development of shared meaning within NRAU and the WPP was rare. Yet, the transactional and authority roles that the different participants in the WPP played fit together into shared action: One person needed to collect data before it could be processed and reported. Someone else might need to analyze the reported data before developing recommendations. Several parties might discuss the recommendations and propose modifications or fine tuning. One participant then might draft a memorandum, which would be reviewed by several parties before it was signed and transmitted. In short, one participant’s work outputs provided inputs to someone else’s.

Action without shared experience, however, frequently led to false starts or interruptions within NRAU that, in turn, contributed to frustration and anxiety. For instance, participants in work planning discussions often communicated at
cross purposes. In contrast, the interorganizational relationships were very successful in producing action. These sharing mechanisms bridged organizational boundaries to tie together NRAU staff with staff members of cooperating organizations. This cooperation seemed to result from common aspects of education, professional experience, and even leisure time pursuits. These people spoke the same language. For instance, the hiker found it easy to communicate with the hiker; the kayaker with the kayaker; and the canoer with the canoer. Thus, the process of agreeing to act seems to benefit from common experiences, shared understandings of terminology, and the mutuality of goals.

In retrospect, it is not particularly surprising that the differences in education, professional experiences, and interests of participants in the WPP were divisive, while the boundary spanning relationships of NRAU staff with people in other organizations were cohesive. After all, the interorganizational counterparts were much more closely connected in interest and intent. These external connections offered some very real benefits for NRAU by keeping the organization in touch with its environment and influencing that environment.

Ongoing. Beginnings and endings in organizational life are obscure in comparison to continuing projects and tasks. Interruptions and shifts from one project or task to another are common. These interruptions in turn contribute to emotions: sometimes positive (“I’m glad to get away from that report for awhile. I really like these crash projects where I get to call up folks in the regional offices.”) and often negative (“Everytime I get close to finishing, there is another change in direction . . .”).

The interaction of participants in the WPP through interactive action mentioned in the analysis of the social property of sense making is also one force for sense making’s ongoing nature: the interactivity serves as an impetus for movement through the process. Interruptions, breakdowns, and the like, however, both agitate and disturb the flow of social action, which promotes unease and emotional responses. Conflict was generated by differences in focus generated by task and authority structures versus boundary spanning structures. In short, NRAU, as an organization, was concerned with both 1) task production and completion to demonstrate successes and 2) environmental scanning and adaptation to respond to the interests of those who control or influence funding and to anticipate change so that action can be taken to influence it. Both of these ends were important for NRAU’s survival.

Extracted and Enacted Cues. Evidence that an organization’s world is changing is extracted from the information gleaned through the contacts of its members with the members of other organizations or through scanning, browsing, or use of various information systems that gather, store, and provide access to information about environmental influences. These extractions, in turn, may lead to enactment of tactical and strategic adaptations that spur further extractions and en-
actments of cues.

Boundary spanning interorganizational relationships provide a well developed mechanism for keeping a finger on happenings that were likely to influence NRAU’s funding. For instance, strategy discussions involving all NRAU staff revealed that there were a variety of potential cooperators with whom mutual relationships did not yet exist. This movement to consider unconventional allies may be useful in expanding support, while possibly raising new options for demonstration projects.

Plausibility. Sense making relies on reasonableness rather than accuracy. Plausibility potentially provides more of a bridge between current understandings and past history to extracted cues than does accuracy, which may only deepen the gap between past, present, and future. In short, sense making requires a good plausible story, not one that is entirely accurate or that comprehensively includes “everything under the sun.”

Such cues were usually processed with little effort towards confirmation. For instance, in reacting to the report of a rumor, the NRAU Chief noted that:

The fact that [someone] passed that comment is reason enough for concern. Even if it is not true. A perception of truth can hurt us.”

The processing of environmental information proved to be a costly part of the WPP process, if only in terms of the interruption of work. Yet, many of the resulting occasions for sense making could be directly linked to positive outcomes.

Summary. Weick (1995) indicates how these seven sense making properties might interact:

Once people begin to act (enactment), they generate tangible outcomes (cues) in some context (social), and this helps them discover (retrospect) what is occurring (ongoing), what needs to be explained (plausibility), and what would be done next (identity enhancement). [p. 55]

His statement emphasizes process and action. Seemingly, each of Weick’s seven sense making properties elaborates on Gidden’s (1984) structuration theory. The following statement indicates one view of how the seven properties interacted in the WPP:

The action to pursue a project approach to technical assistance (enactment) was used to inform others (cues) of a potential for interaction and impact (social) where previous successful and unsuccessful experience (retrospect) was employed to design procedures (ongoing), suggest program impacts (plausibility), and market the program (identity).

Given this process and action view, the next question is: How is organizational sense making accomplished in NRAU? The gloss rests in the communicative events that are considered in the next section.

COMMUNICATIVE EVENTS

In this section communicative events are considered as social constructions that people use to make sense individually and
collectively. As such, communicative events are vehicles for the sharing of experience as well as for expressing and defending positions. Do we really know what we think about some issue until we are in the position of writing or speaking about it (Weick, 1995)? The sharing of experience, positions on issues, “war stories,” and other information incorporates the seven sense making properties to create, modify, or solidify individual interpretations through social interaction. The products of such sense making processes as arguing, expecting, committing, and manipulating are the sense, however temporary, made by the participants and incorporated into personal beliefs or translated into actions (Weick, 1995). In a positive sense, when participants come together to cooperate, communicative events are forces for organizational action. In a negative sense, when participants avoid or are blocked from arguing, expecting, committing, or manipulating, time is lost, information is ambiguous, and action is blocked.

Quotations from participants in the WPP hint at the choices that they made in selecting or avoiding participation in the various communicative events:

Why am I usually late for those meetings? Well, I guess I’m just not into meetings. So much time is spent on the same old stuff. Sometimes I could just scream: How many times do we have to rehash this! It’s like *deja vu.* I can predict what will come up next.

We’ve gone through four drafts of the memo to the regions. I don’t think that he looked at any of them. Then we go for final and he changes the whole approach.

I’d rather wait until they’re not around and leave them notes. Then they can take my comments or leave them and I don’t have to listen to them quibble over wording.

I think it’s better to get everybody together to talk about our different ideas than pass a bunch of paper around.

Even when some folks express their views with anger or hostility, these meetings help me to see the ups and downs of my proposals. I don’t want or expect them to say “right on!” just because I’m the boss.

Individuals create barriers and bridges as they select or avoid communicative events. Organizations are given life by such events (Schrage, 1990). An organization succeeds or fails largely through its selection and performance of communicative events. The recurring structures of communicative events encourage, restrict, shape, and inhibit organizational action as embodied in recurring processes such as work planning. Thus, these events serve as frames that structure the expectations of participants and guide their communicative contact. These recurring structures are implemented by language and patterns of speech acts, turn-taking, openings, endings, interruptions, and the like (Boden, 1994). Ultimately, such events shape the organization’s work flow—its perception of its environment, its productivity and adaptability, its successes and failures, its patterns of sense making and information behavior and its structuration.

A focus on communicative events provides a way of understanding and describing the interaction of the participants in the WPP. While the broadly based analysis of the “Phases of the Moon” was useful in discerning change over time,
the transactional analysis of communicative events adds another analytical perspective: we must understand the events that either transmit or block the transmission of direction and meaning in order to fully understand sense making and associated information behavior.

An Information Mosaic

McKinnon and Bruns (1992) use the idea of an *information mosaic* to express the diversity of tasks, problems, pressures, and information strategies that managers employ:

Those who have actually observed managers at work have reported consistently that the managers they studied seem to be frenetically involved in a stream of apparently unrelated activities punctuated by frequent interruptions, often of the manager's own making. Most managers' time is spent with other people, and oral communication—either in person or by telephone—dominates all other kinds. Managers are continually seeking, receiving, processing, and sending information. (McKinnon and Bruns, 1992: 105)

The focus of their study was on how managers select sources of information as they deal with the problems and issues that occur in their work settings. Their key finding was the importance of the timeliness of information in relation to the task being performed. The managers studied would, for instance, ignore the standard end-of-month reports in favor of a single number on the back of a scrap of paper at the end of a production shift. How do we find out what that indicator is? One approach that is employed here involves recording the trace of sense making and associated information behaviors in an *information mosaic*.

Each form of communicative event provides at least a single link between participants in the WPP; most make multiple linkages possible. Also, each event offers the potential of supporting the full range of the possible information behaviors that might appear as tiles in an *information mosaic*. Figure 3 suggests some labels for these tiles using terms gathered from Kuhlthau (1993a, 1993b), Marchionini (1995), and Taylor (1986).

While training models offer an ideal pattern of information behavior that moves through the rows of Figure 2, the analysis here suggests that there is no guarantee of such a systematic progression as information was collected in advance of understanding or definition of the situation or questions; information was used before it was processed to enhance its value; and an action may be determined in advance of information gathering. Figure 3 provides an *information mosaic* that was typical of the WPP.

To the extent that an *information mosaic* as a representation of information behavior can be called a process, that process is often nonlinear in that there may be repetitive loops through some sequences of tiles. Thus, in the WPP information was often gathered, processed, and examined before it became evident that additional information needed to be gathered. So the cycle began again. Accordingly, I have chosen to use this metaphor of an information mosaic to indicate that
actual sense making and associated information behavior during the WPP took many forms.

**Classification of Communicative Events**

Any approach to classification of communicative events emphasizes some matters over others. Two perspectives are employed here in the analysis of communicative events. The first, following from Eilon (1968), emphasizes kinds of messages, area of activity, message importance, and intent and impact of messages. The other, advocated by Hymes (1986) and known by the SPEAKING mnemonic, provides a framework for ethnographic analysis of communicative events. Table 2, building upon Eilon's taxonomy, provides a first cut at identifying the sorts of communicative events that were employed during the WPP. It also summarizes their strengths and weaknesses as they promote or degrade sense making and, ultimately, productivity. For the purposes here, I have expanded Eilon's distinction of written and oral messages to distinguish between oral events involving three or more participants as meetings and two participants as conversations. This distinction seems significant as the dynamic of multiple participants in a meeting creates opportunities for shared conversations that enable sense making that seem to differ from the two party conversation as a result of the multi-party dynamic.

While there is some overlap, especially in potential, the various forms of communicative events—meetings, conversations, messages and their kinds-tended to serve different functions. Thus, the staff meeting through its round-robin format permitted associations with otherwise independent activities and within NRAU permitted the passing of what often turned out to be important tidbits of information or kernels of an idea. For the WPP, the staff meeting allowed participants to raise issues or concerns. These comments, in turn, were taken as queries that elicited both sources and information as possibly relevant: “Have you thought about contacting [deleted]?” or “I heard from [deleted] that . . .”

The Policy Group meetings focused on particular issues relating to work planning. For this event, information consisted of considered judgments, opinions, and rationales. These forms of information helped participants move through many of the possible tiles that might compose an information mosaic. Understanding and definition as well as planning for information gathering, however, were consistent focuses until the very end of the annual process. While the expectation might be that the emphasis of the discussions within the Policy Group’s meetings would progress over time from definitional and tactical issues to strategic issues of policy and action, they became bogged down in foundational matters. Conditions of uncertainty and ambiguity within the environment of the WPP seemed to be the major culprits in slowing down the process with participants arguing over the necessity of reordering previous commitments. Emphasis on evaluation and use of information only came into play towards the end of the process. Even then, there was more of an emphasis on individual cases to check on the adequacy of the information that had been collected than on comprehensive evaluation and use.
Memoranda, as products, present decisions or formally ask for something in return, often requiring the gathering of information in some format. The information content of memoranda included tables of funds allocations and lists of approved work projects, or instructions, definitions, specifications, and formats.

In summary, there was a specialization of functions across the various communicative events. Yet, this specialization was flexible. While any event could support any of the functions or purposes, a particular event (e.g., the conference call) was better suited to supporting one or two particular purposes or functions (e.g., understand and define, query information sources). As indicated in Table 2, these purposes also influenced what constituted information within the various events as well as what roles the events played in relation to the different elements of the resulting information mosaic. While there was some evolution in the roles that the various events played in the WPP, this evolution was not as pronounced as might be expected (or desired).

Model of Interaction in Communicative Events

This analytical framework highlights key elements in a communicative event using the SPEAKING mnemonic developed by Hymes (1986). SPEAKING provides a faceted framework for identifying patterns of behavior within and among communicative events as well as to highlight those factors that need to be viewed in such an effort (Hymes, 1986; Schiffrin, 1994; Agar, 1994). The elements of SPEAKING are defined as follows:

S cene/setting (physical and subjective meaning of a situation),
P articipants,
E nds (purposes, goals, outcomes),
A cts (message form and content: speech acts),
K ey (tone and manner),
I nstrumentatilities (i.e., channel and forms of speech),
N orms of interaction and interpretation, and
G enres (text types)

The following discussion uses the SPEAKING framework to expose patterns of information behavior that contribute to sense making and impact on productivity within the several classes of communicative events: meetings, conversations, and messages.

Meetings

Meetings have been the “laboratory” of the small group researcher (Zander, 1979). Decision making researchers have also
employed meetings as a study vehicle (Kleindorfer, Kunreuther, & Shoemaker, 1993). Meetings have also received attention in normative works that emphasize "How to do it good" (Jay, 1976). Yet, it is interesting that, while meetings have been employed extensively as tools for research and have been the focus of many prescriptions for improvement, there is little research that focuses on meetings themselves as a topic of investigation.

Schwartzman (1989), who studied the meeting in the setting of a mental health organization, is a major exception. She notes that:

... a meeting provides individuals with a way to create and then discover the meaning of what it is they are doing and saying. (p. 39)

... it is possible to suggest that decisions, policies, problems, and so forth are not what meetings are about. Instead, we need to revise this view and examine the possibility that meetings are what decisions, policies, problems, and crises are about. From this vantage point, decisions, policies, problems and crises occur because they produce meetings and, ... in certain social systems it is meetings that produce "organization," ... (pp. 40-41)

A meeting, thus, becomes both a frame for behavior in an organization and a frame for making sense of the current situation. For the purposes of the research reported here, a communicative event was considered to be a meeting when three or more people gathered together to discuss or resolve some issue relating to work planning.

**SPEAKING for Meetings.**

The remainder of this section contrasts the Chief's, Work Planning-Policy Group, and Work Planning-Task Group meetings as critical examples for understanding sense making processes and their interaction. Table 3 summarizes and compares these three types of meetings using the SPEAKING framework. In the following the insights provided by analysis of each of the elements of the framework are briefly highlighted.

**Setting, Scene.** What might differences in the space and scene contribute to our understanding of sense making, information behavior, and productivity? The sites for the Chiefs and WP-Policy Group meetings are bright and comfortable, but are only available for temporary use. Any props must be removed at the completion of the meeting. The WP-Task Group site has no windows and is cramped. However, the situation allowed working materials to remain in place: flip-chart sheets were taped to the wall, files piled on the floor, and papers spread on the table. This allowed continuity over time that was lost, particularly in the Work Planning Policy Group meetings, where a record might have aided in making sense of signals, arguments, and commitments.

**Participants.** The TA Branch Chief was the only participant who was a regular attendee at each of these meeting types. Otherwise, there were only managers at the Chiefs Meetings and only workers at the WP-Task Group Meetings. The WP-Policy Group Meetings served as a bridge by bringing managers and workers together. This juxtaposition had the
benefit of bringing divergent views to the floor and the disadvantage of raising more views than there were participants. Another disadvantage related to differences in perspective between the managers and the workers. While the managers tended to be interested in high level issues of program continuity (e.g., funding, completion of conservation projects, relations with cooperators), the staff level participants emphasized details of wording and display. Thus, the WP–Policy Group Meetings tended to bog down in the “minutiae” of the WPP. As one manager noted: “In matters of import, it is form and not content that will getcha every time.” No consensus building or conflict resolution mechanism emerged other than that provided by the deadline when there was not enough energy left to quibble.

**Ends.** The various purposes of the meetings fit with important aspects of the WPP. Transmission of information from the top down seemed to proceed tolerably well—the products of the Chiefs meetings contributed information to the WP-Policy Group meetings, which, in turn, furnished information to the WP-Task Group meetings. The Chiefs Meetings emphasized the external view—involving relations with and information about external conditions (Cho & Auster, 1993), and set the tone and framework for the WPP in light of what was detected about the interests and concerns of the PIGs and the legislature. The WP-Policy Group meetings elaborated on and developed a policy framework and associated work planning procedures. The WP-Task Group meetings filled in the framework with details and performed the information planning, gathering and processing work of the WPP. This progression could not be entirely satisfactory because of the inherent uncertainty and ambiguity inherent in the environment of NRAU. Over time, as information became increasingly more certain and less ambiguous, revisions to policy, procedure, and external requirements led to modifications in information gathering and processing work.

In contrast, staff became discouraged and channeled their frustrations and concerns in a bottom to top way. The following comment is expressed by a staff level person during a WP-Policy Group Meeting during Year 3:

TABC: In a very disquieting way yesterday . . . . I had this memo ready to go out to the regions. I don’t know what the story is, but at the end of the 15 minute discussion, I wasn’t sure what he [the NRAU Chief] wanted. Oh, I don’t know . . . So, I’m just gonna go back on first and then we can discuss whatever comments, questions, and concerns people have. Definitions are the first thing that we wanted to go through just so we can be uniform for the managers.

This focus on minutiae seemed to be motivated by the interruption of the flow of work and ambiguity regarding the NRAU Chief’s objectives; the result was anxiety and frustration. The TABC’s solution was to ignore the confusion generated by the conversation with the Chief and proceed through the unacceptable memo line by line.

Frustration breeds frustration. Participants at the managerial level became impatient and concerned with the amount of time that the WPP process consumed. The following quote from the NRAU Deputy Chief in follow up to the
previous quote expresses bewilderment and concern with the focus on definitions and line by line analysis of the draft memorandum:

DC: Before we get into this line by line thing, do you want me to express the concerns that [the Chief] has at this point?

TABC: Absolutely. . . Oh, . . . you want to . . .

TABS: During this meeting?

DC: Yup. If we buy [the Chief]'s message then this memo will be one-quarter of what it is now and there will be that many fewer lines to go . . . through. He is concerned with the amount of time this is taking and with what we are asking the regions to give us. His basic question is why are we asking for all this stuff especially about new projects when there quote: 'ain't a snowball's chance' that we're gonna be able to fund them?

Thus, the ends or purposes of the WPP were operationalized in different ways through these communicative events, with the WP-Policy Group meetings serving as a sort of battle ground for trying to meld the external view of the Chief's meetings with the internal view of the WP-Task Group meetings.

Act Sequence. Analysis of the patterning of conversational units and topics within these three meeting types offers the possibility of insights into how information is introduced, challenged, verified, and used. Comparisons among, for example, openings, closings, overlaps, interruptions, misunderstandings, turn taking, topic shifts, and coherence mechanisms provide clues as to how the meeting creates or stops cooperative action. The discussion here focuses on a few of the patterns identified through this analytical process that have not been raised before.

Information Management. The role of topics and the ease of changing topic varied considerably across the three meeting types. The Chiefs' meeting was by design a multi-topic event. Typically, each participant had a turn to bring up matters of interest usually in order around the table starting with the Chief. Thus, each participant would introduce from one to ten topics at the extreme and lead the discussion or answer questions as necessary. Shifts from this pattern occurred frequently as someone would say: "related to that is . . ." and introduce a related topic out of turn. There were also occasional diversions for a joke or story.

The sum total of this process allowed individuals to argue their positions, raise questions where expectations were challenged, manipulate the situation to promote desired actions, and commit to a position. There were two patterns in the WP-Policy Group meetings that depended on what the impetus for the event was: top down or bottom up. The top down events were generally motivated by and led by the NRAU Chief and allowed freewheeling discussion of likelihoods and strategies.

Alternatively, bottom up events were motivated by the products of the WP-Task Group and were led by the TABC.
In this case, attempts to change the topic and deviate from the systematic movement through task lists or lines in a memorandum were either politely ignored or added to the agenda. Thus, the introduction of new information—that which was not focused on the current agenda item—was often tabled and occasionally forgotten.

The WP-Task Group meetings were very focused on accomplishing some piece of work usually involving the processing of technical assistance project information and topic shifts were largely unnecessary.

Beyond topic shift the vehicles of information management were embedded in conversational units that were devoted to a particular topic. These units were introduced by an opening. For example, the following were typical openings for conversational units within the Chiefs, WP-Policy Group, and WP-Task Group meetings: “[deleted] was selected as the site of the next trail plan,” “Definitions are the first thing that we wanted to go through,” or “OK, now that we are starting to get some of the project forms, how are we going to handle them?” Each of these sets the stage for the rest of the conversational unit. Often, the opening provoked questions (“Who are the local cooperators on the project?”), which encouraged additional information or elaboration on the topic; encouraged comment and opinion (“That’s a good choice. I think the plan has a better chance of being implemented in [deleted]”), which raised alternatives and challenged assumptions; and elicited support and opposition (“I think that is a good idea”), which framed viable options for choice.

*Contributors to Breakdown.* The most frequent issue raised by participants in Year 1 of the WPP as contributing to their frustration was what was typically referred to as “rehashing” or “deja vu.” That topics reoccurred over several meetings was corroborated through study of meeting transcripts. This analysis also indicated that closely similar arguments were made over several meetings. This was particularly the case for WP-Policy Group meetings. Further analysis of the transcripts indicated two contributors: The first through its presence was the typical lengthy discussion, after any civilities had taken place, where participants tried to recollect what had happened in the last meeting and why another meeting had been called. The second through its absence was the lack of any discussion at the end of one meeting to provide a bridge to the next. To these contributors we might add retrospectively Weick’s (1995) suggestion “… that people need to meet more (p. 185)” as “… meetings are sense makers (p. 187).”

Another concern that was frequently mentioned by participants in the Chiefs and WP-Policy Group meetings was on start time and length. While attempts were made to resolve this concern, meetings, especially the Chiefs, started late and went far beyond the stated ending time.

Other critical sources of breakdown that were not apparent to participants in these meeting types were their lack of shared understanding of issues and terminology, along with their confusion about why some issues were raised that were in
conflict with previous agreements to act. This problem became evident during interviews in follow up to unproductive discussions during meetings. A particularly interesting case occurred in connection with the project classification scheme and discussion about the ranking of projects for funding. The initial project classification scheme was unidimensional emphasizing the type of project (e.g., open space, greenway, regional conservation plan), which reflected the responsibilities of the three branches within NRAU. Consequently, preliminary ranking discussions turned into turf battles over how a project should be classified. Comments of participants during meetings, as established by the transcript record, and probing during interviews uncovered a series of implicit criteria that generally differed from participant to participant. For instance, resource requirements including both management and staff needs, scope of the effort (e.g., local, regional, Utopia-wide), project significance, and extent of cooperation were each implicitly employed by different participants in considering project acceptability. Taken together these implicit criteria would have provided a much more productive playing field for discussion and, ultimately, project ranking than did resource type by itself. All of these contributors to breakdown reflect the confusion of the participants and the ambiguity of the matters under discussion.

**Key.** Variation in key reflects differences, among others, in personal style, the status of participants, definitions of information, and the work to be performed, especially in terms of convergence or divergence as a guiding emphasis of the meeting type. For the Chiefs meetings, the NRAU Division Chief encouraged divergence as a strategy for testing possible actions. While the NRAU Chief’s emphasis on monitoring the environment and devising a range of strategies for anticipating and adapting set the tone for topic setting, comments, and discussions, the Branch Chiefs often saw these comments, which were intended to promote discussion (“devil’s advocate”), as challenges to or diversions from previous commitments. While the ensuing arguments accomplished the Chief’s goals of getting feedback on his ideas, such events only served to further confuse, puzzle, and frustrate the others. Information related to the WPP in this setting consisted of, for instance, intelligence about the opinions of external cooperators, the interests and concerns of key legislators, and the likelihoods and status of appropriations.

For the WP-Policy Group meetings the coming together of the thinkers and the workers led to a conflict between interests in meeting the latest in exigencies through change and getting the job done through stability. Status and power differences between the managers and the workers were mediated by the confusion and frustration felt by the workers, who were often challenged to redirect their efforts without the benefit of knowing about the messages from the environment that precipitated adjustments in plans. Information related to the WPP here included, for example, opinions about definitions, the expression of policies and procedures, and scheduling from the workers point of view, and changes in strategy and pol-
icy from the managers point of view.

For the WP-Task Group meetings, all participants, including the TA Branch Chief, assumed worker roles. Leadership passed among the participants depending on the subtask at hand and who had responsibility for that subtask. The participants gave no thought to the impacts of change in, for instance, funding likelihoods or the conditions surrounding the implementation possibilities of individual projects over time. Their focus was directed by an established process, which they were committed to see through to the end. Information consisted of the completed data elements on the project request forms as well as follow up facts obtained through telephone conversations.

The comparative factors highlighted here created a communicative milieu that sometimes aided and sometimes hampered achievement of the purposes of the communicative event. Recognizing what these factors are and how they influence communication and action provides us with meta-knowledge about why stoppages occur. With this meta-knowledge, bridging strategies may be proposed. For instance, no one participating in the WP-Policy Group meetings had a clear sense of why they would rather avoid these meetings or why they felt frustrated during and after these events. The meta-knowledge provided by this analysis provides ammunition for self-assessment and redesign.

Instrumentalities. On the surface the instruments of action during these meetings were similar. How and to what extent the verbal, non-verbal, and physical material instruments were employed differed somewhat among the meeting types. For instance, while each of these three meeting types employed physical materials as props, the work planning meetings used them most frequently and in extensive variety. Flip charts, draft memo’s, tables, and reports—paper and via computer screen—created from the project database were used to organize the flow of the WP-Policy Group meetings. These same devices served as input, organizing tools, and output of WP-Task Group meetings when they were bottom-up occasions.

Norms. While the instruments for conveying information and communicating were generically alike, there were some interesting normative differences in kind and use. For the Chief’s meetings, while the NRAU Chief was the de facto chair, the floor was open to all, interruptions were permitted, and questions and comment were encouraged, even if they were off the track. For the WP-Policy Group meetings, the floor was usually controlled by the WPP staff representatives, especially the TA Branch Chief. For instance, the comments by the NRAU Deputy Chief quoted above regarding the focus on definitions was greeted by the TA Branch Chief’s comment: “OK, let’s go back through . . . keep on going through the draft.” Thus, comment and debate were cut off when they were not relevant in the minds of the WPP staff. Within the WP-Task Group meetings the floor and flow was controlled by the information gathering and processing tasks at hand. The staff

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member who was responsible for the specific subtask led the meeting and controlled the sequence of action.

Genre. The Chiefs and WP-Task Force meetings were more informal and relaxed than the WP-Policy Group meetings. Both allowed humor to punctuate the discussions, relieve tense moments, and maintain polite relations. Anecdotes, "war stories," and other devices were also used to enrich the discussions within these meetings. All of this worked to promote shared understanding of the situations under discussion, not merely transmitting information for individual use.

In contrast, humor was notable by its absence in WP-Policy Group meetings. These Policy Group meetings were motivated by the creation and checking of lists, and movement through documents in step by step methodical fashion. While these devices also appeared in the other kinds of meetings, there was little to break the drudgery and monotony of such place marking devices as "on the next line," "at the bottom of page three," and "let's check off item number 3 and move on to the next." While definitions, for instance, were often discussed, the discussion emphasized consensus on wording rather than a shared understanding of why the definition was necessary and what the implications of different nuances were for the purposes of work planning, let alone commitment to some operating principle.

Discussion. Overall there was a healthy but exhausting airing of ideas, gripes, plaints, and opinions. As a result the WPP was kept open and divergent over too long a time period, especially during Year 1. This created frustration and angst ("Will this ever end!") as well as a feeling of being manipulated ("This seems like one never ending game. When the bell finally rings and the game is over, it is time to start again."). The hardest hit were the people in the Work Planning-Task Group who spent their work lives trying to converge towards products only to have some new or rehashed idea or concern lead to divergence.

Meetings, thus, brought a mix of divergence and convergence that frequently led to confusion and episodes of paralysis. Yet, advantages also were apparent in this behavior. One advantage of the consistent diversity of viewpoints that were expressed during Chiefs and Work Planning-Policy Group meetings was that the accommodations, when arrived at, were crafted to address the variety of concerns of the PIGS as well as resource significance and public policy issues. This counterbalanced a tendency toward inflexibility, perhaps akin to group think (Janis, 1972) that seemed to characterized the approach of the Work Planning-Task Group. Rather, the diversity of rhetorical positions, updates on project proposals, and expressions of support or concern of PIGs and legislative staffs that were expressed during these meetings, ultimately, forced all participants to rethink their positions.

Clearly, the participants saw this series of meetings as efforts to focus interaction on some aspect of the work planning task. Yet, the rhythm of the work planning meetings was consistently punctuated by:
1) late starts—at least one person was up to one-half hour late for each Chiefs or WP-Policy Group meeting,
2) lengthy diversions at the beginnings and endings of meetings that either served social functions or transferred
information about other NRAU activities, and
3) interruptions or asides that lessened the focused interaction effect—whispers between participants while others
had the floor; the of raising points that were not relevant to the work planning discussion underway.

Participants expectations were incorporated into their schemas for these meetings as signaled in the following ways:

1) Those who showed up at the appointed time would ask to be advised when the meeting was ready to begin rather
than wait around for those who were absent.
2) Openings cued for information about non-work planning activities rather than set the agenda for the work
planning activities to be accomplished during the meeting.
3) Participants would sometimes ask subordinate staff to interrupt the meeting and request their emergency assis-
tance if the meeting persisted beyond a set time.
4) Closings only infrequently summarized accomplishments, set the agenda for the next meeting, or solidified work
to be accomplished in the interim. Rather, much time was spent quibbling over the time for the next meeting,
which usually ended up being rescheduled anyway.

All of this seems to yield messages of lack of importance, avoidance, and the like. “All we seem to do is wring our hands
and go over the same options again and again. We will either need to just start the process closer to the end point or meet
once and don’t let anyone out of the room until we have something we can live with.” Overall, these behaviors suggest that
the partners in these meetings had learned to be reluctant to participate. Thus, meetings, which were critical for organiza-
tional sense making, became an ordeal to be avoided.

These characteristics were more prevalent during regularly scheduled meetings. In contrast, meetings that were
called in response to some precipitating event, which were outside the regular flow of the work planning task, but involved
the transfer of critical information, rarely suffered from these forms of diversion. It seemed to the participants that the
spontaneity and focus of such meetings captured their attention and limited extraneous matters. This phenomenon might be
labeled as “rally around the flag” syndrome. That is, the confusion and ambiguity of the individual contributions of WPP
participants, and general lack of understanding of what the meeting was “about” for regularly scheduled meetings seem to
have been overcome by a common threat. The most critical factor leading to finality of an iteration of the WPP was that
the appropriations process was completed. This act eliminated uncertainty and forced resolution of remaining ambiguities in
position and action.

This comparison of three meeting types suggests that different planes of interest were represented and supported through the creation of different communication and information carrying structures and the processes that they supported. While the comparisons of meeting types in this section all involve meetings of three or more persons, differences in the expectations of the persons involved, particularly regarding purpose and function, created distinct environments that sometimes contributed to progress and other times to slowdown, stoppage, or breakdown. For instance, commitment for some included frequent challenges to operating assumptions, while for others it meant follow through to completion. Affective factors, which are often overlooked in studies of information behavior were critical contributors to progress and breakdown. The interruption of the flow of work frustrated some participants, while others were bewildered by the vehemence of opposition to change. This is clearly a place where at least two different language games were in operation and where, consequently, the gap in understanding of the rules and terminology of the different games seemed at time insurmountable (Wittgenstein, 1958; Mauws & Phillips, 1995).

Conversations

The conversation as a communicative event focuses on the interaction between two parties at the same point in time. Viewpoints that seemed important for analytical purposes involved communication channels and the role relationships of conversational partners.

Communication Channels

A communication channel is the instrument for transmitting information. I again use the SPEAKING mnemonic to explicate similarities and differences particularly regarding the use of communication channels for sense making and their impact on productivity.

Setting, Scene. There were two channels employed in the WPP: face-to-face and telephone with the obvious distinction of the presence or absence of interpretative visual cues (e.g., body language). Thus, the greatest contrast between face-to-face and telephone communication involves the physical presence or separation of the parties to the conversation. In order to provide a sense of the nature of these conversations, Table 4 contrasts two illustrative conversations involving face-to-face communication and communication via the telephone.

Participants. Work planning conversations were populated by NRAU staff, regional office personnel, and cooperators.

Ends. From the point of view of sense making and associated information behavior, conversational purposes ran
the full gamut of the possible tiles in an information mosaic from understanding and definition to evaluation and use. A notable exception was that the physical processing of information (e.g., classifying, ordering, arranging) was not an emphasis of these conversations. Too, conversations either of themselves or sequentially through time did not move in systematic order from information need to seeking, to use. Typically the querying of sources, examination of transferred information, and evaluation and use of information led to insights that promoted understanding and definition of the information situation at hand. This might be taken as evidence of a lack of rationality in information behavior. Rather, it seems that the understanding and definition of sense making are achieved through successive iterative querying and analysis of information received.

Act Sequence. The pattern of speech acts was similar for both face-to-face and telephone conversations. Openings and closings were frequently social in character, serving a phatic or channel opening function (Eichman, 1982). Exceptions typically occurred when one or both of the parties were suffering from stress or when time was a critical factor. Beyond any polite repartee the topics of conversations were typically focused on one issue or concern. One party would open with a request for information or action usually in the form of a question. The other would, perhaps, ask for clarification or additional information before responding. Such request response shifts would continue until both participants were satisfied that the discussion was completed.

Telephone conversations seemed to be more concise and focused than face-to-face conversations. Physical presence at the same time and place seemed to encourage deeper discussion. This behavior seems to follow from the greater number of cues that were available in the face-to-face conversations for identifying misunderstandings. The richer situation of face-to-face conversation, while seemingly taking longer, seemed to aid in the reduction of ambiguity in intent and message that pervaded the WPP (Daft & Lengel, 1984, 1986; Rice, 1992; Lee, 1994).

Key. Face-to-face conversations motivated the display of a wider range of strategies, styles, moods, and emotions than were present during meetings. The one-on-one nature of these conversations permitted the participants to express their frustrations through raised voices, tears, stories, and the like that were rare during meetings. Telephone conversations, in contrast, were restricted in their range of emotions and associated conversational devices. For instance, conversational partners seldom reported emotional outbursts.

Instrumentalities. The major difference in the use of these two communication channels is the absence of facial expressions and other body language with a telephone conversation. Such visual information might be employed by speakers to judge the listeners' reactions to the speakers' comments or by listeners to form opinions about speakers' truthfulness.
and confidence in their statements.

**Norms.** Both forms of conversation allow participants to express and satisfy their needs to share opinions and other information, to establish a common understanding of an information carrying situation, or to reach a decision on some matter. Following Grice (1975), principles of cooperation (positive), disinterest (neutral), and absence of cooperation (negative) all seemed to come into play in the WPP. That is, a conversation was initiated by someone who is moved to initiate a cooperative interaction with another person in order to share or obtain information. The other party, in turn, may be cooperative, indifferent, ambivalent, or, for whatever reason, uncooperative or even deceptive in response. While we may learn to discern conversational device’s such as those indicated by Grice’s conceptions of quantity, quality, relation, and manner to provide interpretative clues, we also rely on the cumulative evidence of interaction and feedback over time. Thus, in commenting on the “games” that surfaced periodically, various participants pointed to situations of too much information (quantity–providing a printout including all projects when regional summaries were desired), withholding of information (quality–omitting details from a report when the details indicated discrepancies and inconsistencies), providing information that proved to be inaccurate (quality–indicating that a project had especially strong local support when it did not), offering information that did not pertain to the problem at hand (relevance–asking for particular information and getting a story with no bearing on the initiating situation), and avoiding the issue of concern (manner–employing indirect references (e.g., metaphors, analogies, anecdotes) that do not directly address the issue on the table. It is not possible to ascribe intentionality as contributing to these examples and others involving any of the possible elements of an information mosaic. Yet, it is important to realize that the process of negotiation in a conversation, whether it is minimal or extensive was seen by some of the participants as being limited by the absence of a widespread ethic of cooperation. This climate of game playing simply encouraged more of the same. This recurring pattern within many of the information mosaics that were created during the WPP widened the gaps between participants and reduced productivity.

**Genre.** Participants in face-to-face conversations were able to easily refer to written documents, tables, charts, and other containers of information. The ability to point and mark in reference to particular items under discussion was an important feature when participants were in the same location.

Reference was more difficult to maintain via the telephone. Often one party did not have the report or list that the other held in hand. In this case explanation or reading of numbers or text led to confusion or loss of place by the recipient. This situation usually resulted in repetition or perhaps a repair later in the conversation when the two parties realized that they had miscommunicated. Occasionally, one or the other of the participants did not realize until sometime later that there
had been a transmission error. In the case where both parties to the conversation were referring to the same text, repeated discussion, sometimes in extended Abbott and Costello fashion (e.g., Who's on first?), to establish the reference point was required.

Summary. Differences due to the nature of the communication channel seem largely to evolve from the presence or separation of the parties to the conversation. While telephone conversations seem to more directly achieve the desired ends in a timely fashion, face-to-face conversations seemed to encourage more checking and facilitated identification and correction of errors in understanding.

*Role Relationships*

The two parties to the WPP conversations occupied a variety of roles: superior and subordinate, peer, NRAU employee (internal) and cooperator (external), NRAU employee (staff) and regional office employee (line). The relationship of these patterns of role relationships to the themes of discovering sense making in information behavior and productivity are explored here. Table 5 provides a comparative overview of these role relationships using the SPEAKING framework.

Superior/Subordinate. A primary insight resulting from the analysis here was the vast gulf in perception of purposes and ends between superior and subordinate at the top of the hierarchy, particularly involving the NRAU Chief and the branch chiefs, particularly the (TABC). Discussions initiated by the NRAU Chief emphasized external relations over the internal accomplishment of work—this last being the focus of the TABC—and divergent thinking about alternative strategies for survival.

For instance, the NRAU Chief took great delight in playing the role of devil’s advocate by throwing out ideas or strategies that often were vastly different from those raised in previous conversations. His intent was:

... to test the water. I want to get their [the branch chiefs’] reactions. If it won’t work, then all we have invested is a little bit of time. If the idea has some merit, then we can start fine tuning it. I don’t think that we will survive if we sit down once a year and make a plan or set deadlines based on what the status of things is at that moment. We also have to keep adding to our cooperators. Some of our folks turned up their noses to the suggestion of working with the for profits. Yet, we’ve been able to get the river protectors and the outfitters to go to bat for our program. What would happen if we could get the hydroelectric folk into the conversation?

His subordinates, the branch chiefs, saw this behavior of presenting information in the form of a strategy and asking for reactions as games:

We waste too much time playing his games. We invest a lot of time deciding in which direction to go and then he marches us in the opposite direction.

On the one hand the Chief aims to open up thinking to consider unexplored options (divergence). On the other his subordinates are looking for stability and consistency in order to reach a conclusion or produce a product (convergence). The
branch chiefs in this situation see their relationships with the Chief as power, authority, and control contests. The Chief, in turn, sees his actions as a mechanism for encouraging creativity and involvement. An organization probably needs both.

In contrast, conversational interactions at the other end of the hierarchy, involving staff of the TAB and their branch chief, emphasized work status, operational problems, and next steps. While frustrations were expressed by both superior and subordinate, the conversations were conciliatory and emphasized convergence of work towards interim or end products. Discussion frequently focused on shared definitions or understandings of information requirements, sources, classifications schemes, quality checks, display, and ranking criteria. Analytical and evaluative discussions were absent at this level reflecting a stress on accuracy, conformance to plans, and deadlines. That is, there was a drive to routinize the information definition, collection, and processing aspects of the WPP and make them static, when the dynamics of the political situation required at least some monitoring and scanning of the environment in recognition of changes in signals due to movement through time.

**Peers.** Conversations between peers differed by level within the organization. At the WPP work level, staff functioned as colleagues. Their conversations focused on status—"Have we got the stuff from [deleted] yet?," helping one another—"Do you want me to enter the rest of those project sheets while you're at the meeting?," facts—"Who is the staff contact for the [deleted] project?," procedures—"Do you have time to show me how to create a report from the project database?," and emotional support—"I know these proposals cause you agita. Don't let them get you down. He [the NRAU Chief] just wants to make sure we cover all of our bases by considering options."

At the Branch Chief level the conversations were more adversarial. There was some "turf" protection—"I really think that the [deleted] project fits more into what we are supposed to be doing in the Water Branch. [deleted] is a big supporter of that project and they've already indicated that they're concerned that the river conservation part of the project won't get its due if the trails aspects are emphasized." While at the end of a conversation each party is clear on the other's position, resolution was rare. These situations, then, either fester or are resolved through the devices of the NRAU Chief or Deputy Chief.

**Internal/External.** Conversations between NRAU staff and cooperators from other organizations differed markedly from those between superiors and subordinates, and peers. In contrast to the gaps in interest and perspective that were not bridged during superior/subordinate and peer conversations, internal/external conversations displayed either shared understanding or efforts to reach such shared meaning. While participants represented different organizations, their conversations connected the separate organizations, providing linkages that not only facilitated the transfer of information, but al-
lowed the values and objectives of one organization, usually the external, to seep into the other. Particularly for the NRAU branch chiefs, the external reference organizations became primary contributors to their sense of purpose. Coupled with the programmatic focus of their branch, these interorganizational linkages influenced positions that the branch chiefs took during meetings and other WPP conversations.

This suggests the development of a boundary spanning interorganizational form that is enacted primarily through conversations. This form brings together at least one member from each organization, “hardwires” the flow of information between the organizations, and, ultimately, influences the behavior of each of the organizations as the parties to the linking organization develop common themes and understandings.

Staff/Line. With reference to technical assistance, NRAU is clearly a staff organization. It developed policy and procedures, performed planning and coordination functions, maintained databases and program records, fulfilled marketing and other broad program management duties, and offered general assistance and training. NRAU’s only real formal control mechanism was the allocation of resources through the WPP. Even so, once resources were allocated to a regional office, there was little that could be done to ensure that funds were used entirely as per the plan. Whatever the influence of the allocation mechanism, it was lessened over the three year course of this study as, first, regional directors, and, then, “block grants” effectively eliminated this stick. The threat, however, remained that those regional programs that performed poorly would not receive additional funds should they become available, and would be the first to be cut in the face of funding reductions.

Regional office staffs, in contrast, performed actual project work, “on the ground,” working with actual physical natural resources and the full range of people who were interested or touched by a project. Sometimes projects fell through, were delayed, or took longer to complete than anticipated. These sorts of happenings were viewed with distrust by the NRAU staff. Thus, the conversations initiated by NRAU only served to strain relations between NRAU and the regional office staff. The following excerpt of a conversation between an NRAU staff member and a counterpart in the regional office is indicative:

NRAU: I need to check some of the information that you gave on the project submission forms. It seems to be incomplete and in some cases wrong.

Regional: We did those a couple of months ago based on what we knew at the time. Some things have probably changed. Hey, we do the best we can in the time allowed. Anyway, what do you want to know?
As NRAU's control of the resource allocation process lessened, NRAU's staff realized that the tone of conversations and other communicative interaction with the regional staffs were counter productive. As staff time was made available through simplification of the WPP, efforts were made to develop a supportive, advocacy relationship with the regional staffs. NRAU staff assumed advocacy roles for the regional technical assistance programs, which in concept and design mirrored the internal/external relationships. Conversations, thus, turned from judgment and threat toward cheerleading and encouragement.

Overall, conversations involving two participants succeeded to a much greater degree than multi-party meetings in reaching an end that was satisfactory to those involved. This was, in part, the result of the tendency of conversations to have much greater clarity in purpose and meaning than work planning meetings did. That is, the expectations of participants regarding purposes and outcomes, which were major sources of ambiguity in meetings, were more closely met. Conversations also succeeded because their reciprocal, two-party nature reduced the variety, complexity, and uncertainty of arguments by more seamlessly allowing participants to raise confusion and puzzlement. Conversations also allowed participants to more flexibly and freely gain the floor to raise their concerns and point of view.

This is not to say that conversations should serve as a substitute for meetings. Rather, the two forms of communicative event served separate functions in the WPP with conversations addressing matters locally involving the two participants and meetings more globally enabling shared experience, enactment of expectations, the contribution of various points of view through argument, and the resulting commitment to action.

**Messages**

Messages comprise the set of written communications that were constructed as artifacts of the WPP. As indicated in Table 2, a variety of messages types were employed in the WPP, each reflecting a different situation, purpose, and degree of formality or permanence: memoranda, guidelines, forms, tables, notes, and e-mail.

Typically, all of these message types carry information that bridges the other forms of communicative event. Thus, messages were either products of the WPP or links that kept information and the process flowing. As the messages are asynchronous, involving communication that does not take place at the same point in time, they serve the general functions of informing and requesting. The remainder of this section contrasts the message types as designs for maintaining momentum when synchronicity is not possible. Table 6, which is the major vehicle for this analysis, summarizes and compares message types using the SPEAKING framework. In Table 6 message types are grouped into three categories—memos and guidelines, forms and tables, and notes and e-mail—to reflect their special role and contribution to the WPP.
**Memos and Guidelines**

These document types codify the WPP and its products—ultimately funded projects or funds allocations to the regional offices. As such, these products make a statement of commitment to the process and the actions required to make the WPP work. They are the culmination of the arguing, expecting, committing, and manipulating inherent in sense making. Wallas (as cited in Weick, 1995, p. 12) relates the comments of a young child “. . . who being told to be sure of her meaning before she spoke said ‘How can I know what I think till I see what I say?’ (Wallas, 1926, p. 106).” In short, we may not really know what we think until we are able to speak or write down our sense of the situation. This is, I think, a fundamental insight into sense making.

As Feldman (1989) notes in her study of policy making in the U.S. Department of Energy:

Written documents play an important role in this interpretative process [of characterizing a policy issue]. In the process of writing, an author must take a complex reality and structure it into a linear, more simple presentation . . . Because of the need to make sense within a reasonable time and space limitation, only details relevant to the proposed interpretation can be presented. Details that may support other interpretations are omitted. The written document establishes a frame that becomes part of the organizational memory. In the future, when the issue, event, person, or situation is reconsidered, this information will be influential because it reminds people to pay attention to certain features and because it provides a basis for comparison (pp. 91-92).

Thus, the written record, particularly in the form of memoranda and guidelines, comprises what at the time seemed to participants as endless arguing. All of the actions, arguments, frustration, and elation that went into the construction of the document are at best only vaguely remembered. Especially for those not present during the sense making process, the document is the primary vehicle for sense making.

**Forms and Tables**

At their best, these document types are devices for noticing inconsistencies and discrepancies, or reducing a mass of information into a comprehensible and manageable format. At their worst they can confuse and obfuscate. There were occasions of both the best and worst during the WPP. While these devices were sometimes ignored when they were particularly incomprehensible, their value as supports to sense making came from their being as a physical point of reference to provide a focus for discussion during meetings and conversations. Thus, the physical thing helped participants to target their thinking in a way that did not often occur when words were flying around. In discussing a form or table, categories were frequently explained, challenged, and respecified. In addition, inconsistencies were pointed out; interpretations were challenged and as a result clarified:

Wouldn’t it help encourage the regions to submit projects in that area if we had an open space label?

Those numbers don’t add up to the total there. There seems to be about $200,000 missing. Was a project left off the list somewhere or was there an addition mistake?
So this is what you meant when you said that the region was trying to put one over on us? It may be that they interpreted the instructions in a different way. Have you talked to them at all?"

In short, the devices of forms and tables provided a concrete reference point for reduction in ambiguity.

**Notes and e-mail**

These messages primarily conveyed in-process requests for information or comment. They had a similar effect as the forms and tables in providing islands in the swamp of confusion and ambiguity: something to focus on or signal misunderstanding, disagreement, uncertainty, equivocality, or, in general, something of which collective sense must be made.

The major difference between forms and tables and notes and e-mail relates to their degree of anonymity. Notes and e-mail were from one person to another. For these, there is a definiteness of who is communicating with whom. Forms were never signed and often not even dated. A typical gambit in meetings and conversations was:

How is this one [held in the left hand] different from this one [held in the right hand]? Are they the same or is one newer?

These sorts of confusions required unproductive time for clarification, which reoccurred frequently over the course of the WPP.

**Summary**

All of these message forms had clarifying impacts on the WPP. They did not exist by themselves, but were both contributors to and products of the process of sense making. Identity problems, particularly with forms and tables, contributed to the sluggishness of the WPP, where time was required to identify a piece of paper’s place in the process—past history or the last word. The solution of simply dating the pieces of paper and labeling with the name of the originator, while occasionally mentioned, was, however, lost as time moved on.

The overall theme of the communicative events that were employed in the WPP is that they were all vehicles of sense making. Each variation contributes much to the creation of the information mosaics that are created during work from individual information behaviors, pieces of information, and exchanges. Too, these events often contributed to confusion and ambiguity in understanding the intentions or expectations of participants, especially when those present were participating in different language games. All of this bogged down the sense making process.

The next section continues the discovery of sense making in the WPP with a focus on individual sense making.

**INDIVIDUAL SENSE MAKING**

Having reflected upon the WPP from the perspectives of the complete process, organizational sense making, and communicative events, the focus of the research lens now turns to the individual participants in the process, where the sense making styles and associated information behaviors of participants are examined.
Sense Making Styles

The fundamental analytical approach employed in this study involved the specification of categories and names for those categories to describe patterns of communication and information behavior in the sense making that influenced the WPP. Since there are potentially many ways to categorize and name these patterns of behavior, it is important to clarify this categorization process in prelude to viewing those styles in use. Following the lead of Anthropology’s emic and etic distinction,2 my first analytical action was to attempt to understand the similarity and diversity of participants views regarding their information behavior in sense making (emic). Yet, it was clear from the participants’ responses during interviews that they did not conceive of a separate something that information scientists might call information search or information seeking. Different people employed different information strategies in their work, but these were not differentiated by the participants in this study with a distinctive label. Rather, such information behaviors were viewed as “. . . the normal things that I do when I do work planning or any other part of my job.”

Moving to an etic point of view, I characterized the WPP participants’ actions in terms of their information mosaics and in other ways that relied on my sense of the basis of their actions through the triangulation of observation, interviews, transcripts of meetings and conversations, and the documentary remains of the WPP. In order to test the validity and reliability of my coding and interpretation, I checked them with WPP participants and intellectual peers. I also followed paths originating in the forest of these data to the theory and research of such fields as Anthropology, Psychology, and Sociology in order to relate the behavior that I observed and that the participants described to the theories, conceptual frameworks, and research findings of these disciplines and interdisciplines.

The result of this analysis process was the specification of a set of three interrelated factors that influence sense making and associated information behavior: cognition, affect, and conation. Descriptions of these factors are provided before addressing how they contribute to the information styles of the WPP participants.

Cognition

In trying to consistently describe the information behavior that I had observed, that was present in the transcripts of communicative events, and that appeared during follow-up interviews, I eventually realized that much of what I was seeing, reading, and hearing concerned perception, recognition, conception, thinking, and judgment. These processes all seemed to be related to what has been labeled as cognition, where people develop an appreciation of an object in a way that builds on

2 Emic refers to the research subjects sense of the situation; etic to the researcher's sense of behavior in the context of theory and research relevant to the research questions. The two views taken together provide a mechanism of checks and balances in the analysis process. See, for instance, Sandstrom & Sandstrom (1995) for further discussion of these perspectives.
their previous knowledge and experience, cognitive apparatus, and the task and other aspects of the situation. Key aspects of cognition that frequently created an environment for breakdowns in productivity and progress in the WPP included: focus of the field of perception, memory of previous actions and communicative events, differences in information processing and analysis approaches from analytic to holistic, variation in knowledge of organizational rules and procedures, and biases in the evaluation and use of information. For instance, participants in the WPP seemed to focus and control their perceptive apparatus in different ways: some emphasized internal operations and neglected external (environmental) forces, others focused on external happenings and were inattentive to the internal, and a few paid attention to both. Individuals frequently forgot the details of previous discussions or interpreted the commitments to action of those discussions in contradictory ways. Action alternatives were sometimes found to be inappropriate due to constraints imposed on communications by the policies and procedures of DNR or the legislature. Individual analysis and decision making was also subject to the range of information processing biases or heuristics (Tversky & Kahneman, 1981).

Affect

After coding appropriate behaviors as involving cognition, I revisited the data to considered what other aspects of sense making might be present. Most obvious were the outbursts of anger and expressions of frustration. Further consideration led to the insight that there were also many instances of positive expressions of emotions: excitement, laughter, and other evidence of happiness. Actually, there was a whole range of affective behavior from happy to sad, anxiety to exuberance, and frustration to satisfaction. Miller (1991) views these affective behaviors as ranging from:

... emotional stability [to] instability, [which] refers to consistent individual differences in the intensity of emotional reactions to daily life. At one extreme of the dimension are those who lead lives of vivid intensity, reacting to even mundane events with such strength of feeling as to make life for both themselves and others difficult, if not unbearable. In contrast are those relatively placid souls, slow to anger or excite, whose lives are permeated by a degree of blandness. One senses that they look out onto a world coloured in pastel shades, rather than the extremes of light and dark so characteristic of the more emotionally reactive. (p. 69).

While I would not characterize any of the WPP participants as bland, each did exhibit their own characteristic affective behaviors.

For the WPP, expressions of emotions, feelings, temperament, mood, and the like seemed to either mitigate or amplify sense making behavior. In anger, positive aspects of the situation were often lost; in joy, the downside sometimes went unnoticed. Thus, cognition cannot be fully understood without understanding the role of affection. The role of feelings and other affects has also been noted in research reported by Kuhlthau (1993) and Mellon (1990),

Conation

Again, I appraised the data. Upon reflection each of the players in the WPP demonstrated their own action preferences. For
instance, while some participants resisted change, others sought it. While some were quick to try out an idea, others insisted upon gathering information first. My first thought was to name this phenomenon personality, but personality is too broad a term as it encompasses cognition, affect, temperament, this something that I was trying to name, and their interactions (Messick, 1987; Miller, 1991). That is, WPP participants were motivated to insist upon some actions to the extent that they would follow their instincts even when faced with widespread resistance. In insisting upon actions, they, in turn, resisted the approaches of others. Alternatively, an individual might also simply accept the actions of others, where neither insistence or resistance was in operation. This acceptance might be viewed as ambivalence, but the contextual evidence from the WPP suggested a mediatory position of encouraging consensus.

It is difficult to simply delineate an individual’s instinctive likes and dislikes or drives (unconscious) and volitions (conscious) as each WPP participant showed different combinations: Some were compelled to gather information, emphasizing, for instance, the collection of facts about projects or the opinions of legislators. “Why don’t we call all of the regional offices and get their reaction before we proceed?” Others favored information processing or organizing strategies, including the preparation of tables or the sorting and ranking of information. “I’ve been taking notes and we have the flip chart sheets. Let me put all of this together in a chart. Then we can see if it makes sense.” Certain participants emphasized innovation and quick testing of options. “I think that we should test the water with a demo project. We can learn from the experience and fine tune our approach if it works. If it doesn’t, we won’t have invested much.” A few insisted upon carrying a plan through to its fruition, even if changing conditions reduced the expected value of the product. “We are already halfway through our plan. I think we should keep on going and do the allocations as we had already decided.”

What to name this phenomenon? I have chosen conation as the preferred term and there is a little story to tell about its selection. In February, 1992 I participated in the Fourth Symposium on Human Factors in Information Systems at Arizona State University - West in Phoenix, AZ. One of the sessions involved a presentation by Kathy Kolbe revolving around her KCI™ (Kolbe Conative Index™), which measures, in my words, action instincts. This is in contrast to a social profile such as Myers-Briggs, which emphasizes how a person wishes to be seen by others. As I reflected upon the WPP participants’ instincts to act, it occurred to me that this sounded very much like what Kolbe had described during that session and has more recently written about (Kolbe, 1993). She defines conation as involving four sorts of instincts:

*probing*, which encourages in-depth investigation;

*patterning*, which makes us seek order;

*innovating*, which leads to experimentation; and
demonstrating, which translates abstract ideas into concrete form.

In Kolbe’s view, the probe, pattern, innovate, and demonstrate instincts correspond to fact finder, follow through, quick start, and implementor modes of action.

Having identified the term conation in Kolbe’s context, I wondered about the term’s history of use. When I delved into the literature of Psychology, I found that the term, which had apparently been in general use as a psychological concept earlier in this century, had fallen into disfavor, and then was revived in the learning literature (Snow & Farr, 1987) and in the definition of personality (Miller, 1991) to stand with cognition and affect as factors that impact on learning, productivity, change, and other dynamic aspects of work. Where conation had once been viewed as a specific form of behavior, it was now seen as an aspect of all behavior. Thus, conation, affection, and cognition are not independent sources of behavior. So ends my short story.

Overall, there was considerable diversity in the expressions of conative behavior in the WPP. Variety in action instincts fostered misunderstanding, mistrust, and the feeling of game playing expressed by participants in the process. Yet, a mutual understanding of these action instincts might mitigate such resulting hostility or feelings of manipulation, while aiding participants in understanding how different action instincts contribute to productivity and quality in work.

**Styles**

Thus, these broad categories of cognition, affection, and conation were not mutually exclusive or independent in influencing information behavior as many data items involved each of the three contributors to learning, progress, and breakdown. Rather, the behaviors that they summarize seem to be the product of their interaction. For this reason, I have chosen to portray the thoughts, feelings, and action instincts of the individual participants in the WPP through what I label as information styles. As Messick (1987) notes:

> To the extent that personal styles display generality in the organization and control of attention, impulse, thought, and behavior, they constitute important variables for our purposes because they bridge not only structure and process but cognitive and noncognitive domains of functioning. (p. 37)

I want to emphasize that no claim is being made as to the generalizability of the information styles that I identified among the participants in the WPP or that the label suggested as descriptive of the style completely encapsulates the rich behavior of participants over a three year period. Rather, these designations attempt to seize something of the sense making personalities of the individual participants. At the same time, while we might expect and even desire that sense making behavior will adapt to the requirements of different phases of a task, whether it be work planning or the information search process accompanying the writing of a paper, this was not the case for the participants in this study. They seemed to follow
their preferences throughout the process. Thus, while an individual’s style preferences might promote productivity at some stages of the WPP, it may have been blocking at others. A question for further research involves whether individuals can modify their information styles to better fit with the aspect of the information intensive task that they are confronting. This end seems to be the emphasis of Kuhlthau's stream of research as evidenced by *Teaching the Library Research Process* (Kuhlthau, 1994).

Table 7 names the sense making styles of the primary WPP participants and provides examples of their associated cognitive, affective, and conative behaviors. The appellations chosen to represent the various styles of information behavior in a single word indicate the broad impression of effects of consistent patterns of information behavior in light of the organizational roles occupied by the participants and the influence of the situations and tasks studied. The information style moniker, thus, represents the interaction of individual information behaviors, role, and situation. So, while the cognitive, affective, and conative behaviors of the CAB Chief and first CAB staff member are very similar, their roles and tasks led them to be characterized as Analyst and Organizer, respectively, to reflect an overall sense of their behaviors and role in the WPP.

**Holist (NRAU Chief).** Scanned the environment seeking tidbits of information. Used that information to create a holistic view of contextual and situational forces. Employed this “big picture” to generate possible futures and develop associated strategies that allow the organization to adapt and survive in a turbulent political and social environment. Sense making was directed towards the discovery of a reason to act and follow-up consideration of action strategies. These strategies were tested through abstract simulations, which set up a special form of language game that was not either familiar or obvious to the rest of the participants in the WPP:

I’ve just heard from [deleted] about her meeting with the House committee staff. She says that given the budget targets there is no chance for an increase. There will probably even be a small decrease—part of a small across the board cut—though they expect to recommend continued funding at this year’s level. Given this, I don’t see the point of continuing down the primrose path that we have defined. It makes no sense to waste time collecting information on new projects that we cannot fund. How about simplifying the process substantially by giving the regions a target allocation figure and letting them decide on what old and new project they can do within the target figure?

Thus, the Holist style ensured that futures were evaluated in light of current intelligence through needs analysis and the development of strategies for change. Its disadvantage is that it tended to impede progress by interrupting ongoing operations with abstract adaptive strategies. The perception of many WPP participants of this style as “game playing” was brought about by the abstract nature of the conversations, which was intended to “...toss out an idea to see what the reaction is” and interpreted as “...a serious change in direction.” Yet, without this emphasis on adaptation and change, it is
doubtful that NRAU could have survived in a time of downsizing in government.

**Manager (Deputy Chief).** The concern underlying this style was production and performance. Change was something to be managed. Completion of a product by a deadline was a source of good feelings; though impossible or sudden deadlines were sources of frustration. While perfection was felt to be unattainable, incremental movement in that direction was one emphasis of this style. In particular, the Manager style consisted of listening to all of those involved in the situation to obtain necessary facts and processing those facts to create innovative solutions that bring people together to enable progress. Sense making aimed for the resolution of conflict as indicated by this statement at the opening of a meeting:

> We need to get things moving again. I guess there hasn’t been any progress over the last month? I’d like to start by going around the table and get your comments on the hold-ups and any concerns you have. Let’s do this without interruption the first time around. Then, we can see if we can get it moving again.

This style has the advantage of providing bridges between different viewpoints through their airing and encouraging the development of common expectations and commitment. This style promoted various strategies including operational testing of change proposals, consensus building, and compromise that led to constructive and consensual change. Thus, the style aided in developing a shared vision of the issues that needed to be faced. The rub here was that the Manager style only came into play when the WPP suffered from close to terminal breakdown in communicative relations among its participants, as the NRAU Deputy Chief role was primarily devoted to other tasks. Still the style enabled the process to begin moving again.

**Analyst (TABC).** With this style, tasks and problems were broken down into their component parts. Key parts were, then, selected for further treatment. The remaining parts no longer received active attention. Thus, the Analyst focused attention on those aspects of the situation that were felt to be critical. Information gathering emphasized collection of facts about those critical aspects. Information processing emphasized entry, editing, sorting, filtering, and presentation of key facts. Lists were created to assure attention to details. Accomplishment was measured by checking items off a list. Sense making aimed for understanding discrepancies between planned and actual performance:

> We have on our schedule that we are gonna send the allocation process instructions to the region next Wednesday. I don’t see how we can make that deadline. We haven’t received input for the bits [activities] managed by either the Land or Water Resources Branches.

Attempts to move attention to anything beyond the key parts was seen as an unnecessary diversion and was resisted. Such attempts to refocus were sources of anxiety and frustration. The advantage of this style was its strong commitment to production. The disadvantage of the style was that it discouraged consideration of the adaptive strategies that were
essential in a turbulent environment.

**Organizer** *(TABs).* This style stressed order, organization, standards, plans, and consistency. Deviation from order encouraged efforts to return to order. Sense making aims for making the subjective objective and for replacing the fuzzy with clear well-defined edges:

I’m not sure what they really mean with some of the entries on the project status forms. Certainly, if we entered what they put down, we would never be able to retrieve records by different sorts of project characteristics. So, I’ve set up codes that cover the kinds of queries that have come up and apply them to what the regions give us. If their entry really doesn’t make sense, I call them up and get them to explain. Then, I fit their explanation into my codes.

Actions to organize tended to breed structure and limit flexibility. The systems of categories and associated classification decisions for technical assistance project attributes that were developed through the Organizer style sometimes did not fit with the issues of interest in prioritizing and selecting projects for funding. In fact, some important issues were hidden from view by a category system that directed attention away from some of the fundamental project selection criteria. For instance, while projects might be described as fitting into land or water categories, that category scheme led discussion away from important issues of project impact and significance towards battles of “clods” and “whey”:

OK, the project clearly fits both land and water categories. Why argue about fitting a square peg into either a round or triangular hole? The important thing isn’t whose list the project goes on. Where does this one rank in relation to others? How do we know that?

In addition, such difficult to specify selection criteria as public support, resource significance, tangible impact, and appropriateness were not defined through a category structure. Thus, an organizing process that was very rigid contributed to frequent back tracking to either reclassify or gain information about characteristics that were essential to keep the discussion moving towards commitment to action.

The Organizer style’s advantage was that it enabled quick access to a large collection of information on technical assistance projects and their characteristics. Its disadvantage was that variations from the expectations of the staff member doing the organizing regarding access to information often could not be accommodated without additional information gathering. This, in sum, is the dilemma of information organization.

**Processor** *(TABs).* This style gives weight to the processing or manipulation of information. The emphasis in this style was on getting the job done. Sense making aims for successful translation of plans into action or task completion. Thus, production was the overall concern:

I’m not into policy and fighting over what needs to be done. Just tell me what you want and I will do it. I enjoy getting things done.

The “worker bee” who follows a plan of action and asks for guidance when problems arise was critical to the WPP process.
Communicator \textit{(LRBC)}. For this style, readily available information was selected and summarized to develop a statement, usually oral, that provocatively addressed some issue of concern. The information mosaics that were created with this style did not show systematic gathering of information. Rather, search was usually confined to selected pieces of reports, memos, conversations, and the like that were readily at hand. The processing of information selected in this way involved plausible rather than logical reasoning. That is, the selected pieces of information were brought together in a creative way to make a persuasive and plausible argument in support of a position. The process involved manipulation; the product was a good story. Sense making emphasized the social in planning and rehearsing an approach for persuading others that the espoused position was the best. The process started with the desired end and proceeded to find facts that supported that end position.

These skills present in the Communicator style were particularly beneficial when they were channeled towards support of the entire organization and were sometimes disadvantageous when they promoted the position of the Land Resources Branch (LRB). In sum, the arguments were persuasive, yet they were incomplete, trying to shine a favorable light on the desired outcome.

Transmitter \textit{(WRBC)}. The emphasis of this style was the selective transmission of information from external contacts to influence policies, procedures, and decisions of NRAU and from internal contacts to inform external cooperators. This style almost singularly involved message delivery. Sense making involved selection of messages for transmission. It was beneficial in that it brought different views into consideration that otherwise might not receive attention. Since the message transfer was not systematic, it tended to provide a slanted view, that excluded other positions or concerns.

Discussion. Together with Table 7, the brief synopses of information styles attempt to highlight the nature and contribution of cognitive, affective, and conative information behaviors associated with sense making in the WPP. As each of the styles made both significant contributions and at other times contributed to breakdowns and slowdowns, it would be inappropriate to interpret the analysis presented here promoting some styles over others. The implication of the analysis is that no single style is likely to be “optimal” in a setting where work requires the collaboration of multiple participants. Rather, the mix of styles contributed much to NRAU’s success in gaining support for its technical assistance activities. Yet, the recycling of issues, the frequent proposals for change, and the delays resulting from unmet deadlines, all worked together, at times, to impede progress and raise the general anxiety level. The challenge for organizational design, especially with reference to information and communication systems is to reduce the conflicts that different styles produce when they act in association.
Presentations of styles (e.g., learning, personality) typically attempt to encapsulate a great deal of variability in data into a small number of dimensions. Given the small number of cases, the speculative and preliminary nature of interpretations of the WPP data, and the interest here in the level of individual differences, the exposition here emphasizes the diversity of approach that is likely to be found in the ongoing operations and interactions of an organization. When people come together to work cooperatively, they naturally bring differences that either impede progress or must be accommodated. Forcing someone into a corner by making them operate in an uncomfortable manner usually worsens the situation. Such individual differences need to be recognized and positively employed to benefit both the individuals involved and the organization. Thus, basic to conflict reduction or productivity improvement is simply an understanding that different people gather, process, use information, and make sense in different ways. Ultimately, this understanding might be employed to select staff for team assignments or to shift responsibilities during the various phases of a task.

This individual view of sense making styles suggests that people’s instincts or action preferences lead them to target particular information actions (tiles), which lead to individually characteristic information mosaics. For instance, the Holist style emphasized repeated cycling between gathering information, defining the situation, brainstorming options, evaluating options, and acting if the evaluation was successful. The result was that some desirable “tiles” were not employed or used infrequently, while a sequence of “tiles” was often repeated.

SUMMARY AND IMPLICATIONS

The analysis focused on the work planning task and how the sense making and associated information behavior of participants unfolded as the task was performed. The major finding was that information collection and processing needed to be repeated at great cost in time and effort as a result of an absence of thinking through the detailed information requirements of the WPP (e.g., collecting information before project evaluation criteria had been established) and the uncertainty and ambiguity of information about projects that had aged for many months. Information has a time value and managing time while managing information may improve productivity.

Organizational sense making surrounding the WPP was viewed and evaluated against Weick’s (1995) framework. Key aspects of NRAU’s long term survival has been its successes in adapting to changing environmental conditions and its achievement of visible conservation impacts. These successes were founded in 1) environmental monitoring and associated responses to signals of change in order to control that change and enact future conditions, and 2) the completion of the projects that were selected during the WPP. During most of the time of this study efforts were misplaced and productivity was Lessened by an emphasis on the WPP, which took time and effort away from environmental adaptation and project comple-
tion needs. During Year 3 effort directed toward the WPP was reduced to place the focus of organizational action on these key aspects of success. Understanding what organizational actions are critical to short and long terms survival seem to be fundamental in defining appropriate information mosaics and sense making strategies.

The role of various communicative events was considered. Meetings, conversations, and messages are essential mechanisms of individual and organizational sense making and associated information behavior. They benefit sense making by providing opportunities for shared experiences that encourage the discussion that enables commitment to action. Yet, too often, these events, particularly meetings, led to confusion, frustration, and other blocks to progress. The combination of uncertainty of funding through a turbulent environment and ambiguity of meaning and intent among participants came together in the language games of meetings. The solution seems to revolve around recognition of such blocks to progress. Once such blocks are recognized they need to be confronted and addressed or they will continue to stand in the way of progress.

Individual factors and patterns of behavior were investigated. This analysis suggested that cognitive, affective, and conative factors interact to form styles of individual sense making and information behavior. As people with various information styles interacted during work, misunderstandings and conflicts in approach occurred. Recognition of such gap producing differences in style may allow their attenuation by fitting them into a coordinated team effort. Too, information behavior seems to be dynamically associated with an individual’s place in their sense making process.

To complete this research report, I offer the following discussion of possible contributions and implications for methodology, information design and management, sense making research, and productivity.

Methodology

I purposively bit off a large chunk of organizational work life to allow a broad information world view that allowed consideration of change over time. In the process I discovered a great deal about how individuals in a particular organization make sense over time as they focus on a complex task whose very real objective was not anything as simple as actually selecting projects for funding, but survival. How difficult is it to capture the informational aspects of months of organizational life in an circumscribed manuscript? Very! How well have I succeeded in bringing these dynamics to life? Not. There is much that somehow does not fit, or that requires further reflection.

This suggests the downside of such comprehensive naturalistic designs: this work is the culmination of three years of data collection and another three years of analysis, reflection, and writing--albeit not full time. Yet, such research can be done and doing so offers challenges and the potential for understanding that are far beyond those that I have experienced.
with research designs that were more limited in construction. Yet much can be discovered during periods of lesser engagement (see, for example, Kvavik, Fafchamps, Jones, and Karimi, 1992).

Also, I wonder about the possibility of individuals, who are working together in organizations to perform tasks, applying meta-analysis of their efforts toward improvement. In this study, the availability of transcripts of meetings, for instance, provided one impetus for getting off the "merry-go-round" and simplifying the WPP while increasing support for actual project completion.

**Information Design and Management**

In compressing three years of the participants’ work lives, this research report can only begin to help discern information design and management principles and strategies. Much depends on situations and personalities. It seems to me, however, that one key is in understanding how individual sense making and associated information behaviors come together through various communicative events in a process of structuration to create the organization. This interactive process of making order and creating chaos (Dervin, 1994; Thietart & Forgues, 1995) and of recursive movement from between structure and action (Giddens, 1984) was often characterized by some of the participants in this study as information games. On these occasions the games were not fun; the term expresses feelings of manipulation, destruction of commitments, interruptions in the flow of work, and arguments where hostility was often vented. Yet, there were occasions where definitive commitments were crafted. Time, as in looming deadline, was certainly one force for completion and final commitment. There is another dimension of time that comes into play: the time when the situation is as certain (versus uncertain) and clear (versus ambiguous) as it is likely to get. Clearly, no matter what the NRAU Chief intended, he could not bring himself to close his options until there was no longer any possibility that he could influence what his options were.

Recognizing that these information games are part and parcel of the process that people use to protect themselves, what might be the implications of meeting and conversations about the rules of these games? If people who are brought together to complete some task find that they are suffering from feelings of manipulation, anxiety, and the like, what would happen if they got together and collectively tried to make sense of what was blocking their progress? If we can understand the rules of the game that each participant is using, perhaps, we can begin to understand how to design and manage. For instance, while the participants in the WPP never were fully able to understand the rules that the different participants were using to “play the game,” ultimately all participants understood that the process was consuming too much time and effort. Their agreement to compress the WPP and wait until the legislature had made some commitment serendipitously freed the participants from the prison that they had collectively created.
Understanding of Sense Making and Information Behavior.

Why is charting the human side of the information field critical? The natural tendency of participants in the WPP was to ask for everything they could think of and then discover after collection and processing that much of what they had asked for was not used and much of what they wanted was missing. Issues of selection or coverage (e.g., include everything or select by principle), representation (i.e., what pieces of information to include and how to represent them), information organization (e.g., controlled or free text), retrieval strategies (e.g., browsing or direct entry), and display approaches (e.g., graphic or textual) all influence an information system's ability to support people as they make the sense that is fundamental to interpretation (Weick, 1995: 7-8). Understanding people's life and work problems, tracing their information mosaics, and discovering the changes that result as people progress through time and space all offer the possibility of inspiring design. Such inspiration is often critical to system success, even though such details will likely complicate the design process.

How might the findings of the research reported here influence systems design? I suspect that the primary implication is the need for collective reflection on the nature and characteristics of the task at hand, its interactions with other tasks, the cycle of the task, the various relationships of participants in the task (e.g., superior/subordinate, internal/external), and the information styles of participants as a start. It appears that we need to know where we want to end up, the rules of the varied games in play, and the strengths and weaknesses of the resources available to us before we can effectively begin to design the process. This is something more than stating goals or objectives but a frank sharing of insights, possibilities, implications, probabilities, intelligence, constraints, and so on. Such strategic sense making is difficult to achieve. It is not just a piece of paper with a mission statement and some goals. Rather, it is the achievement of the understanding that went into the creation of that piece of paper along with appreciation of individual positions and a common commitment to courses of action. This was something that was achieved from time to time during the WPP, especially when the participants gathered to meet a clear threat. Fundamental, then, is clarity of the reason and circumstances for action. The last thing that we need to do at the beginning is to start a comprehensive information collection process.

Productivity Enhancement in Information Intensive Tasks

In the WPP and in other tasks performed in NRAU productivity was not an emphasis. While rationality was emphasized through, for instance, the surface systematicity of information collection and processing, or the specification of evaluation mechanisms, there was no evidence of such related ethics of productivity enhancement, team work, or quality management (Isgar & Isgar, 1993). Thus, information is collected at considerable cost even though it is never used or if it is used it is out-of-date and "smelly, like a day-old fish." Being able to present the appearance of rationality has emotional as well as
dollar costs. Ultimately, productivity may receive its due when it is seen as more than a measure of output per unit of labor, but a process, where learning is the key element and the expectation is not only improvement, but sense making that promotes adaptation to meet the information worlds of the future.

REFERENCES


<table>
<thead>
<tr>
<th>Understand/Define Task/Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify/Gather/Select/Filter/Monitor/Scan/Browse</td>
</tr>
<tr>
<td>Organize/Process/Sort</td>
</tr>
<tr>
<td>Display/Present</td>
</tr>
<tr>
<td>Examine/Analyze/Notice</td>
</tr>
<tr>
<td>Brainstorm/Strategize</td>
</tr>
<tr>
<td>Evaluate/Judge</td>
</tr>
<tr>
<td>Decide/Act</td>
</tr>
</tbody>
</table>

Figure 2 – Some Labels for Tiles of an Information Mosaic

![Figure 3 – A Sample Information Mosaic](image-url)
Table 1
Project Selection Criteria

Definitions

*Technical Assistance Program*—provides expertise while working cooperatively with public and private interests; emphasizes resource assessment and protection strategies over design and development; grants-in-aid are not available.

*Assessments*—a systematic resource planning process designed to comprehensively identify important and threatened resources, and to lead to implementation strategies for conservation and use.

*Corridor Plans*—focuses on a particular resource, identifies conservation issues and priorities, and develop public and private protection strategies, including implementation.

Minimal Requirements

*Cooperation and Cost-sharing*—each project must demonstrate cooperation among affected public agencies and private interests including the sharing of project cost.

*Public Involvement*—each project must have a meaningful public involvement component as a foundation for success.

*Clear Goals, Objectives, and Deadlines*—goals must be clear; objectives must be measurable; deadlines must be established and realistic.

*Results Orientation*—a product or result must be specified.

Project Selection Criteria

*Resource Significance*—the resource is of major significance.

*Tangible Impact*—the project will be cost-effective and lead to a tangible conservation achievement.

*Public Support*—the project will generate visibility and public support for conservation of the resource.

*Appropriateness*—the results or products would not otherwise occur.

*Use*—the resource has the potential to serve large numbers of people.

*Innovation*—the project is pioneering.

*New Areas*—the project focuses on a new opportunity rather than expansion.

*Staff Development*—the project contributes to staff experience and falls within staff capability.

*Door Opener*—project is in an area of Utopia where few, if any, projects have been done before.
<table>
<thead>
<tr>
<th>Communicative Event</th>
<th>Frequency &amp; Situation</th>
<th>Purpose</th>
<th>Strengths &amp; Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meetings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff</td>
<td>Biweekly. Length: 1 hour. Included all NRAU staff.</td>
<td>Sharing of information; announcement of events. Helped establish expectations and commitment.</td>
<td>Something between “show &amp; tell” and Oprah. Mostly this is what is happening and this is what is going to happen. Yet there was sufficient gossip to keep participants interested.</td>
</tr>
<tr>
<td>Chiefs</td>
<td>Weekly. Length: 1 hour. Includes NRAU Chief, Deputy Chief, 3 Branch Chiefs.</td>
<td>General sharing of information and discussion of issues. Work planning was but one topic among many. Argument was the major sense making process. A lack of shared experiences or frames for understanding blocked progress.</td>
<td>Provided a scheduled time for dealing with management issues. Lack of coherence from meeting to meeting. Much wasted time as one participant was frequently late. Different participants showed different information styles.</td>
</tr>
<tr>
<td>Program</td>
<td>Annual. Length: 3 days. Includes all technical assistance program staff from NRAU and the regions. Cooperators attend portions.</td>
<td>Staff training. Sharing of experiences. For work planning: discussion of policies, procedures, and funding. The shared experience helped to form expectations and commitment to project work standards.</td>
<td>Participants describe the experience as “very intense.” Primarily involves exchange of information.</td>
</tr>
<tr>
<td>Conference Calls</td>
<td>Ad hoc (4 times per year). 10 to 30 minutes. Usually included NRAU Chief, Technical Assistance Branch Chief, and regional office program chiefs.</td>
<td>Discuss proposed policy issues and procedures related to work planning. Share information among the regional offices and the NRAU office. Clarified expectations; restricted arguing.</td>
<td>These sessions were very focused on the agenda items and virtually free of “chit-chat.” Regional office staff found them particularly valuable as they turned rumor and innuendo into fact.</td>
</tr>
<tr>
<td>Work Planning-Policy Group</td>
<td>Ad hoc (about 5 times per iteration of the WPP. Included three branch chiefs, two staff, and either the NRAU Chief or Deputy Chief.</td>
<td>Develop policy details and point by point wording of policy and procedure documents. While different points of view were presented during arguments, the ambiguity in terminology and interpretations underlying the arguments blocked movement to act.</td>
<td>There was an inherent conflict between the TABC’s focus and that of the NRAU Chief and other branch chiefs: The TABC often focused on the nitty-gritty details of the WPP. The others, while interested in different aspects of the process were more concerned with basic policy issues and that their interests were not being addressed. Thus, while some were focusing on basic information elements, others were trying to understand the need for the element at the policy level.</td>
</tr>
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</table>
Table 2 (continued)

Communicative Events in Work Planning

<table>
<thead>
<tr>
<th>Communicative Event</th>
<th>Frequency &amp; Situation</th>
<th>Purpose</th>
<th>Strengths &amp; Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Planning– Task Group</td>
<td>About 200 hours of work per annual iteration of the WPP. Team consisted of the TA Branch Chief and 2 staff. In addition, 2 regional office staff and 1 PIG liaison participated in project selection ranking.</td>
<td>This team under the leadership of the TA Branch Chief performed the information processing functions associated with the WPP (e.g., collection, indexing, abstracting, retrieval, display).</td>
<td>The team’s focus on the details of information processing and the myriad of nitty gritty minutiae that is necessary in managing and maintaining a database limited their ability to accept alternative ideas and interpretations of the information collected. This led to a variation of the “group-think” phenomena. They were particularly frustrated when the policy team did not get excited about their focus on details.</td>
</tr>
</tbody>
</table>

Conversations

<table>
<thead>
<tr>
<th>Phone</th>
<th>Ad hoc (about 95 per work planning iteration)</th>
<th>initiated by regional office staff tended to ask procedural questions.</th>
<th>An attempt to initiate a face-to-face conversation was often stopped by the absence of the addressee. This situation led to other communicative events: conversations with others, note leavings, retries.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face-to-Face</td>
<td>Ad hoc (about 65 per work planning iteration). At least one party was NRAU staff; the other could be NRAU, regional office, legislative, or PIG staff.</td>
<td>Both face-to-face and phone conversations focused on the transmission or gathering of information. For instance, conversations addressed from NRAU staff to regional office staff tended towards project status. Those</td>
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<td></td>
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<td></td>
<td>“Telephone tag” was often a problem with this communicative mode. When parties connected, it provided a relative immediacy for handling the issue that served as the impetus for the conversation.</td>
</tr>
</tbody>
</table>

Messages

<table>
<thead>
<tr>
<th>Memoranda (on letterhead)</th>
<th>As the most formal communicative event (as a result of surname requirement of participants and signature by NRAU Chief or DNR Administrator), there were only a handful during each work planning iteration.</th>
<th>They communicated policies, procedures, or resource allocation decisions as appropriate for the particular subphase of the WPP.</th>
<th>It took a great deal of time to go through the surname process, which ate into the time that regional office staff had to gather requested information or begin work.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines</td>
<td>These were either attached to memoranda or passed out at meetings for review.</td>
<td>Guidelines were developed to specify project selection criteria. After their initial development, they received only minor attention.</td>
<td>The criteria contained in the guidelines were often ambiguous in application, which was subject to misunderstanding, and misinterpretation.</td>
</tr>
<tr>
<td>Communicative Event</td>
<td>Frequency &amp; Situation</td>
<td>Purpose</td>
<td>Strengths &amp; Weaknesses</td>
</tr>
<tr>
<td>---------------------</td>
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</tr>
<tr>
<td>Forms</td>
<td>Project and Project Status Forms.</td>
<td>Information gathering</td>
<td>Extraneous information elements were included. Some key elements were excluded. Information aged quickly.</td>
</tr>
<tr>
<td>Tables</td>
<td>Project information, Project allocation lists (25 drafts and final copy)</td>
<td>Information sharing</td>
<td>Tended to include all information elements and all projects when a subset of information or projects would have fit with an individuals use of the information.</td>
</tr>
<tr>
<td>Notes</td>
<td>These were informal requests for information, to review a draft, or to schedule an event meeting. Those directed to multiple recipients were often typed; those addressed to single parties were usually handwritten.</td>
<td>They were employed frequently for routine matters or when the recipient was not physically available to request or transmit information.</td>
<td>One staff member, in particular, would wait until a recipient had left the office before delivering a message, thus, avoiding personal contact.</td>
</tr>
<tr>
<td>e-mail</td>
<td>Three messages initiated by one of the regions. Response was by another channel.</td>
<td>Messages provide a response to requests for project information.</td>
<td>Mechanism was very awkward, requiring dial-up to an e-mail service, transition through a very awkward interface. Since usage of the e-mail link was low and access was awkward, messages needed to be announced via phone.</td>
</tr>
</tbody>
</table>
Table 3

SPEAKING for Three Meeting Types

<table>
<thead>
<tr>
<th>Meeting Types</th>
<th>Chief’s Meeting</th>
<th>Work Planning–Policy Group Meetings</th>
<th>Work Planning–Task Group Meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting, Scene</td>
<td>NRAU Chief’s Office. Informal around round table with plants and natural light from large windows.</td>
<td>Hearing room with impressive judicial bench, comfortable chairs, and table large enough to accommodate all. Formality of the space seems to carry over to the meeting.</td>
<td>Storage area converted to meeting space with large table; cramped; bare walls covered with large sheets of flip-chart paper.</td>
</tr>
<tr>
<td>Participants</td>
<td>NRAU Chief, DC, Branch Chiefs (3) or their stand-in’s</td>
<td>Branch Chiefs (3) or their stand-in’s (TABC served as chair); NRAU Chief or Deputy Chief; and TAB staff (2).</td>
<td>TABC and TABs (2)</td>
</tr>
<tr>
<td>Ends</td>
<td>Overt. Share information; consider alternative scenarios and outcomes; modify strategies to meet external exigencies. Covert. Manipulation of outcomes.</td>
<td>Overt. Establish work planning policy &amp; procedures. Covert. Conflict in focus between task group members (meet deadlines, follow agreed upon procedures) &amp; other participants (reconsider approach based on changing conditions &amp; evaluation of conflicting information.</td>
<td>Overt. Gather, edit, organize, enter, retrieve project related information. Check work progress, approach, and adherence to schedule.</td>
</tr>
<tr>
<td>Act Sequence</td>
<td>Holding pattern to await latecomers; opening by NRAU Chief to set initial agenda; round robin discussion of items; control of agenda proceeds around table until all have been heard; summary of follow-up items; ending.</td>
<td>Opened by TABC, usually by commenting on delays, frustrations, etc.; sets agenda and asks for additional items; works through agenda; interruptions to make points; round the table discussion of policy and procedural issues; ending.</td>
<td>Initiator opens with statement; others request clarification or make comments; work samples are introduced; consensus is reached as to approach; frustration and annoyance are expressed due to changes in policy direction or delays; summary of resolution or follow-up; ending.</td>
</tr>
<tr>
<td>Key</td>
<td>Relaxed, open, frank.</td>
<td>Serious; brusque, tense punctuated with humor, whining, righteous indignation, and other rhetorical devices.</td>
<td>Low key and open with some whining.</td>
</tr>
<tr>
<td>Instrumentalities</td>
<td>Verbal, non-verbal, memos.</td>
<td>Verbal, non-verbal, lists.</td>
<td>Verbal, non-verbal, lists.</td>
</tr>
<tr>
<td>Norms</td>
<td>Minimal attention to authority structure; multiple viewpoints; devil’s advocate evaluation of scenarios; emphasis on strategy and future implications.</td>
<td>Rational, considered, in depth review of policy and procedures coupled with inflexible adherence to previous decisions in conflict with adaptation and creative solutions to meet the changing situation.</td>
<td>Methodical, systematic, and thorough coupled with resistance to change.</td>
</tr>
<tr>
<td>Genre</td>
<td>Quotations, strategies, invective, jokes, stories.</td>
<td>Lists, drafts of memos and policy guidelines, quotations, concerns, and strategies.</td>
<td>Lists, reports, forms.</td>
</tr>
<tr>
<td>Setting, Scene</td>
<td>Face-to-Face: Change in information gathering (Year 3) from projects to regional office summary.</td>
<td>Phone: Gathering “intelligence” about likelihood of funding increases (Year 3).</td>
<td></td>
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<td>----------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Participants</td>
<td>NRAU Deputy Chief (DC) and Technical Assistance Branch staff member (TABS).</td>
<td>NRAU Chief (C) and Chair of PIG coalition (PCC).</td>
<td></td>
</tr>
<tr>
<td>Ends</td>
<td>DC: understand other’s point of view, consider changes. TABs: express frustration with change &amp; anxiety about job.</td>
<td>C: get others assessment of funding likelihoods, play out strategies for various likely outcomes. PCC: convey “intelligence.”</td>
<td></td>
</tr>
<tr>
<td>Act Sequence</td>
<td>No opening. TABs abruptly begins long monologue expressing frustrations and anxieties. DC indicates reasons for change. Encourages TABs to comment on the change. TABs makes some points about information needed. DC asks about the timeline for the Annual Report, which is a couple of months in the future. Agreement reached that required information would best be collected closer to the deadlines.</td>
<td>Opening focuses on an upcoming hike that both would like to attend. Both indicate that they had initiated calls to find out/tell about conversations that PCC had had with legislators about funding likelihoods. Discuss results. They discuss some further ideas about keeping the excitement going when there is no growth.</td>
<td></td>
</tr>
<tr>
<td>Key</td>
<td>TABs: emotional, serious. DC: concerned, willing to listen, open to suggestions.</td>
<td>Friendly, comfortable.</td>
<td></td>
</tr>
<tr>
<td>Instrumentalities</td>
<td>Oral, voice modulation, body movements.</td>
<td>Oral, modulation of voice.</td>
<td></td>
</tr>
<tr>
<td>Norms</td>
<td>Interaction is based on the need for shared understanding &amp; ambiguity reduction—why a change in procedure is required versus why such a change is unnecessary.</td>
<td>Interaction is based on need for information that reduces the uncertainty about future funding as well as gaining the insights of a valued cooperater.</td>
<td></td>
</tr>
<tr>
<td>Genre</td>
<td>Face-to-face conversation is a rich form of communication allowing exchange of both information communicated orally with its intonation and tone and “body language.”</td>
<td>Telephone communication is less rich in interpretative cues than face-to-face, but still offers a much richer communication format than asynchronous forms of communication involving written texts.</td>
<td></td>
</tr>
<tr>
<td>Setting, Scene</td>
<td>Superior/Subordinate</td>
<td>Peer</td>
<td>Internal/External</td>
</tr>
<tr>
<td>---------------------</td>
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<td>-------------------</td>
</tr>
<tr>
<td>Face-to-face</td>
<td>Face-to-face</td>
<td>Telephone</td>
<td>Telephone</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
<td>Initiated by Chief with TABC.</td>
<td>Initiated by one branch chief with another.</td>
<td>Initiated by branch chief with cooperator.</td>
</tr>
<tr>
<td><strong>Ends</strong></td>
<td>To get the reactions of others to survival strategies. To diversify the organization's approaches for maintaining support.</td>
<td>Ostensibly, to obtain the other's support. Actually, to understand the other's views to strengthen the rationale for their preferred position.</td>
<td>To gather support for NRAU's activities. To gain ideas for program modifications or initiatives.</td>
</tr>
<tr>
<td><strong>Act Sequence</strong></td>
<td>The initiative of the Chief is taken as &quot;bouncing off the walls&quot; by the TABC.</td>
<td>The initiator raises the question. Reaction is provided. Discussion ensues regarding points of argument. Some point are conceded; other are unresolved.</td>
<td>Common ground is established through the mention of interests (e.g., kayaking). Discussion of issues and concerns relating to the technical assistance program proceeds to build common understanding and solutions.</td>
</tr>
<tr>
<td><strong>Key</strong></td>
<td>The Chief know that the other is irritated, but cannot figure out why. The TABC cannot understand why the Chief seems intent on diversions.</td>
<td>The tone is one of formality and civility. There is something of the feeling of a debate here: point and counterpoint, where the conversation is not designed to result in agreement or solution, but to garner support from the observers, except that none are present.</td>
<td>The tone of the conversation suggests that the parties are trying to develop a friendship first and then accomplish the work purpose. It seems that the sharing of information must be based on a common understanding of one another.</td>
</tr>
<tr>
<td><strong>Instrumentalities</strong></td>
<td>The TABC raises his voice and speaks in a staccato fashion to emphasize his displeasure. The Chief speaks softly and calmly to try to mitigate the situation.</td>
<td>There is no evidence of animosity. Rather, these conversations are part of the &quot;game.&quot; The parties try to agree. There is no measure of winning or loosing.</td>
<td>There is considerable laughter as common experiences and friends are disclosed.</td>
</tr>
</tbody>
</table>
Table 5 (continued)

SPEAKING for Typical Conversations: Illustrating Role Relationships

<table>
<thead>
<tr>
<th>Norms</th>
<th>Superior/ Subordinate</th>
<th>Peer</th>
<th>Internal/ External</th>
<th>Staff/ Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a divergence of norms. The Chief tries to get the TABC to consider alternatives. The branch chief cannot accept deviation from the plan.</td>
<td>The peer conversation is in expectation ultimately pro forma.</td>
<td>The parties cooperatively work to find a way to get along on a personal basis, while cooperating at the organizational level.</td>
<td>There is the difference between the people who set the schedule, establish the deadlines, and measure conformance and those who face the day to day problems of bad weather and delays in getting soil samples.</td>
<td></td>
</tr>
</tbody>
</table>

<p>| Genre | | Comments from cooperators that support the argument being made or contradict the argument of the other party are introduced into the discussion. | The parties disclose experiences as they seek connections. The connections provide a foundation for the interorganizational links and information transfer. | The parties refer to completed project forms submitted by the regional office. |</p>
<table>
<thead>
<tr>
<th>Setting, Scene</th>
<th>Memos/Guidelines</th>
<th>Forms/Tables</th>
<th>Notes/E-Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting, Scene</td>
<td>Formal promulgation; signed, dated</td>
<td>Provide structure, definition, organization to the WPP.</td>
<td>Informal; often undated with typed name.</td>
</tr>
<tr>
<td>Participants</td>
<td>Originator (TABs), reviewers (TABC, other branch chiefs, NRAU Chief and Deputy), signers (NRAU Chief, DNR Administrator or Assistant Administrator). To: Regional Office Directors. Cc: Regional Office Program Chiefs, PIGs.</td>
<td>Originator (TA Branch Staff). Users/reviewers (potentially all WPP participants including regional office and PIG staffs).</td>
<td>Originator (any WPP participant); User/recipient (any other WPP participant).</td>
</tr>
<tr>
<td>Ends</td>
<td>Inform interested parties of policy, procedure, or resource allocation decisions</td>
<td>Information gathering and summary devices</td>
<td>Transmit requests (e.g., review of drafts, interpretations of meaning, reactions to strategies, scheduling of meetings)</td>
</tr>
<tr>
<td>Act Sequence</td>
<td>Establish authority; express rationale; specify requirements; establish deadlines; list contacts; ending.</td>
<td>Specify required information elements for gathering or display.</td>
<td>Request or query; specify parameters of the request; deadline.</td>
</tr>
<tr>
<td>Key</td>
<td>Formal language; passive voice; lengthy exposition; attachments; dense.</td>
<td>Information gathering: frameworks, definitions. Information summary: lists.</td>
<td>Informal (often handwritten); brief.</td>
</tr>
<tr>
<td>Instrumentalities</td>
<td>Written giving interim and final products of the WPP.</td>
<td>Written, telegraphic, records status at selected point in the WPP.</td>
<td>Written tool for managing the WPP and coordinating the activities of participants.</td>
</tr>
<tr>
<td>Norms</td>
<td>Interaction is based on need for standardization or structure in the performance of work.</td>
<td>Interaction is based on need for information.</td>
<td>Interaction is based on need for action.</td>
</tr>
<tr>
<td>Genre</td>
<td>Memo is a genre in the WP situation.</td>
<td>Forms and tables convey expectations regarding information needed.</td>
<td>Local language.</td>
</tr>
<tr>
<td>Information Style</td>
<td>Role</td>
<td>Cognitive Behaviors</td>
<td>Affective Behaviors</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Holist</td>
<td>NRAU Chief</td>
<td>Perceptual system is open. Scans for events likely to influence the organization. Generates many alternative courses of action. Waits until the final moment to commit to action.</td>
<td>Appreciates feedback, even when critical. Seldom indicates frustration. “Cannot suffer fools”: avoids contact with those who have lost his confidence.</td>
</tr>
<tr>
<td>Manager</td>
<td>NRAU Deputy Chief</td>
<td>Develops indicators of organizational status. Collects information to evaluate these indicators of progress. Uses the indicators to point out problems and possible solutions before they become costly. Relies on intuitions: “They have never failed me.”</td>
<td>Avoids quick judgments. Listens to all sides of a dispute. Tries to find common ground and use that common ground to mediate. Personally frustrated by the slow pace of the WPP and the rehashing of points previously discussed.</td>
</tr>
<tr>
<td>Analyst</td>
<td>Chief, Technical Assistance</td>
<td>Methodically processes information collected and received by summarizing and making follow up lists. Processes all informational input for fear of missing something. Uses this information to specify goals.</td>
<td>Overtly displays dissatisfaction and frustration. Confrontational in approach. Outspoken.</td>
</tr>
<tr>
<td>Organizer</td>
<td>Staff, Technical Assistance</td>
<td>Information analysis focused on detecting inconsistencies and inaccuracies. Information collection focused on correcting errors or finding missing data. Emphasizes summarization, categorization, and classification.</td>
<td>Frequently displays dissatisfaction and frustration with any change in direction. Responses in these situations are emotional, reflecting changes in voice and body language from usual demeanor. Often negative.</td>
</tr>
<tr>
<td>Processor</td>
<td>Staff, Technical Assistance</td>
<td>Collects data to meet the requirements of the plan. Processes data in conformance with established procedures. Presents information in specified formats.</td>
<td>Confident, pleasant, and unaffected by appropriate modifications to plans. Expresses objections to changes in plan in a positive, friendly manner. Constructive.</td>
</tr>
</tbody>
</table>
Table 7 (continued)

Sense Making Styles of WPP Participants

<table>
<thead>
<tr>
<th>Information Style</th>
<th>Role</th>
<th>Cognitive Behaviors</th>
<th>Affective Behaviors</th>
<th>Conative Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presenter</td>
<td>Chief, Land Resources</td>
<td>Data collection emphasizes status of ongoing activities. Processing is superficial. Status is passed on with justification for delays. Decisions are made and problems are solved when forced.</td>
<td>Avoids emotional displays. Forcefully and positively presents point of view and tries to influence actions. “Bones” are “picked” in public and not behind someone’s back. Outspoken.</td>
<td>Raises pros and cons of information collected by others; resists being boxed in by others agendas; emphasizes practicality, while trying to assess implications of innovations promoted by others; manages implementation of plans.</td>
</tr>
<tr>
<td>Transmitter</td>
<td>Chief, Water</td>
<td>Information gathering focuses on a small number of personal contacts. The views or anecdotes supplied by these contacts are employed as rationale for supporting or rejecting positions on agenda items.</td>
<td>Withdraws from tense or uncomfortable situations. When corralled expresses frustration and hostility. Silent except when encouraged.</td>
<td>Collects facts to support position; resists order on a personal level, tolerates order generated by others; resists innovation when in conflict with agenda, accepts innovations of others when they fit with personal agenda; responds to implementation requirements in a plodding fashion.</td>
</tr>
</tbody>
</table>